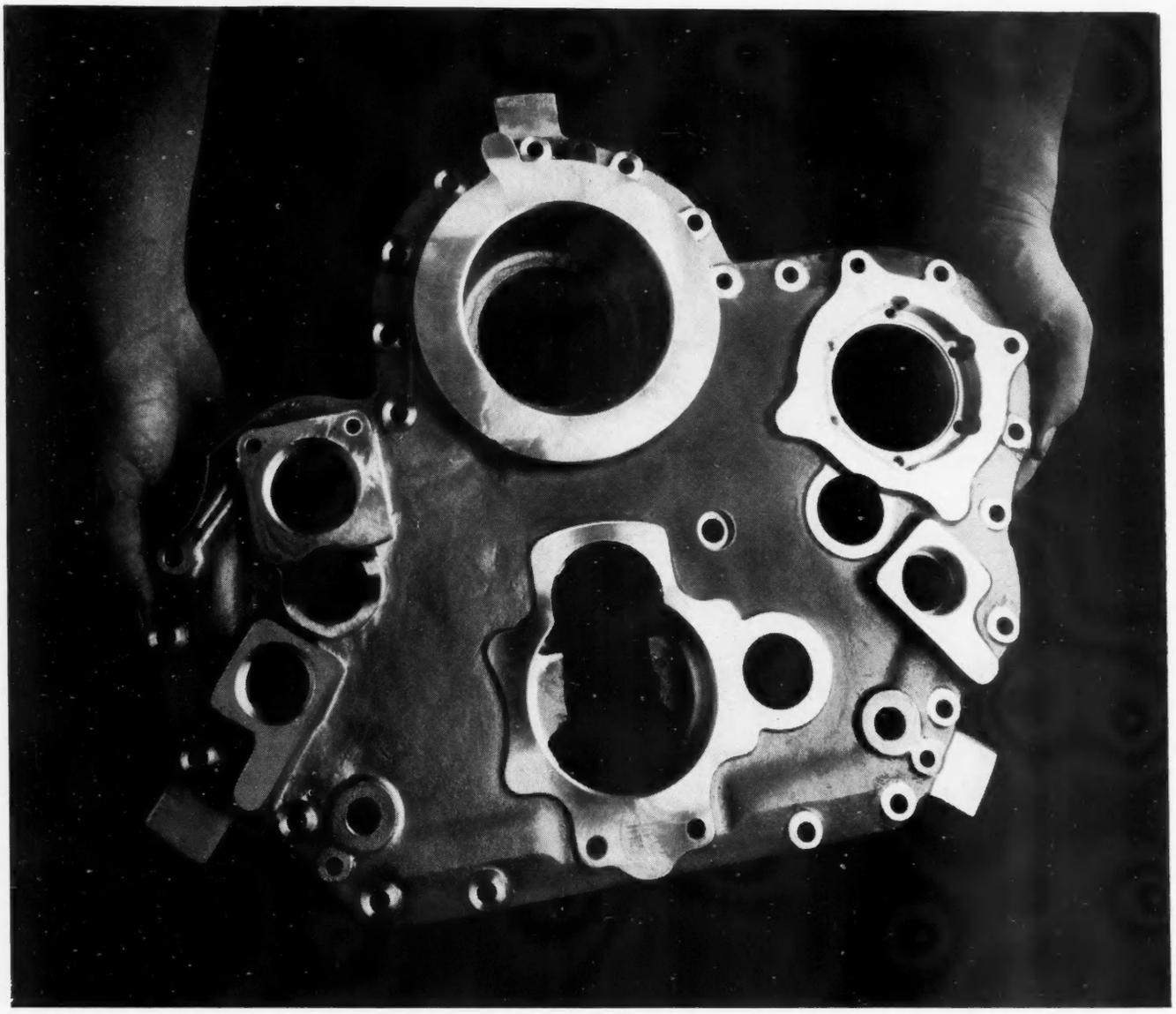
AUTOMOTIVE INDUSTRIES

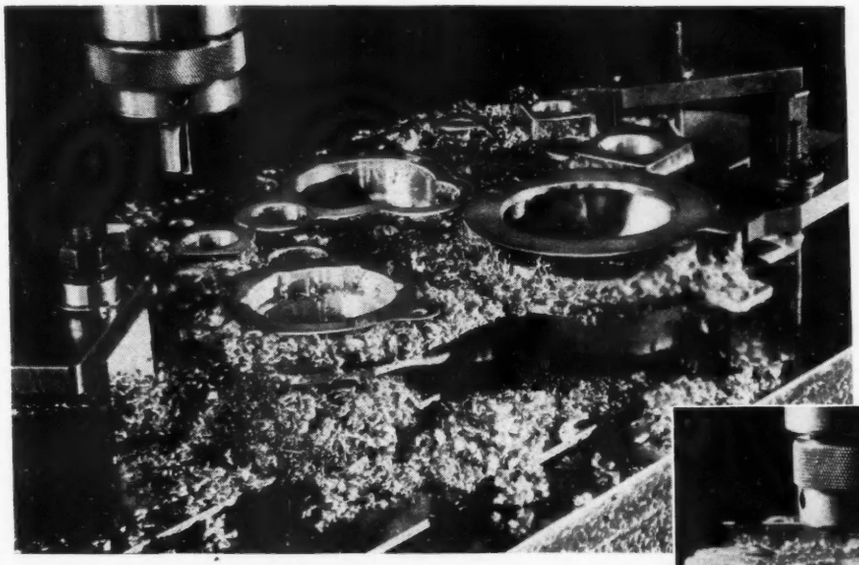
LAND — AIR — WATER

DECEMBER 24, 1938

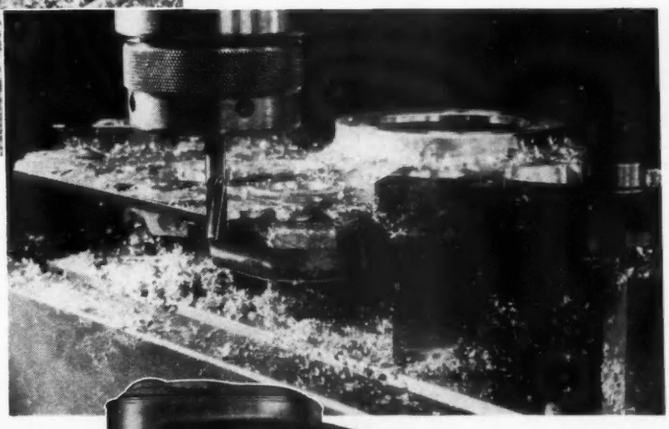


Presenting Accuracy
from a Pratt & Whitney Jig Borer

The piece is an experimental engine part. Tolerances were close, and the various flat surfaces had to be faced in exact relationship to each other. By using a Pratt & Whitney No. 2A Jig Borer for all machining operations, a far more accurately finished product was obtained *and the estimated saving was 30%.*



All machining operations on this aluminum casting were done with a Pratt & Whitney No. 2A Jig Borer. This included drilling, reaming, precision boring and counterboring the holes, facing the flat surfaces and milling the edges. The only time the position of the piece on the table was changed during these operations was to turn it over for machining the opposite side. The picture at the left shows one of the counterboring operations. The picture below shows the edges being milled.

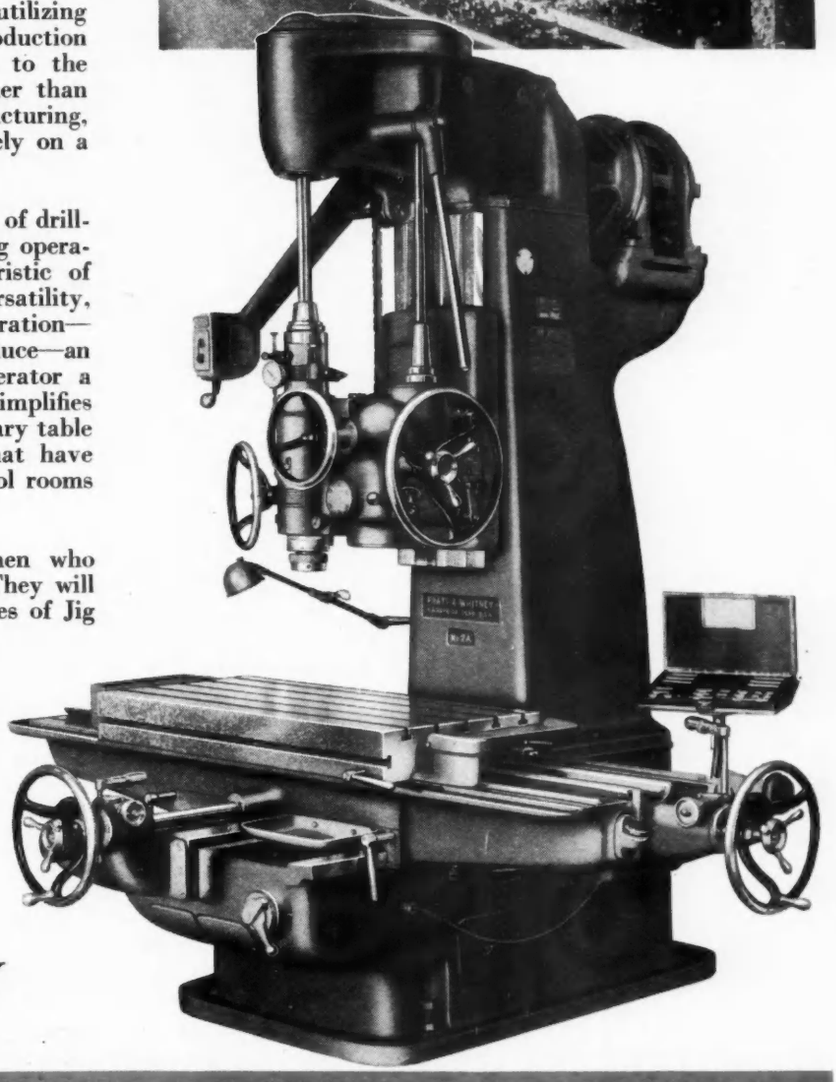


"Production Profits Hinge on Precision"

THIS PIECE is typical of Pratt & Whitney Jig Borer applications as a tool room manufacturing machine. Manufacturers with well-equipped tool rooms everywhere are realizing huge savings by utilizing this machine for many of their small lot production and experimental model jobs, in addition to the regular run of jig and fixture work. Rather than build up special tooling for small lot manufacturing, the work itself often can be done completely on a P&W Jig Borer.

The machine is capable of a wide variety of drilling, reaming, boring, facing and chamfering operations, all with the fine accuracy characteristic of Jig Borer practice. In addition to this versatility, P&W Jig Borers have speed and ease of operation—accuracy to "tenths" in the work they produce—an open-side construction that gives the operator a chance to watch the progress of his work, simplifies the setup and provides a wider range of rotary table applications—and many other features that have made the P&W Jig Borer a favorite in tool rooms everywhere.

Our representatives are experienced men who know Jig Borers and what they will do. They will be glad to discuss with you the possibilities of Jig Borer applications in your own tool room.



Pratt & Whitney
DIVISION NILES-BEMENT-POND COMPANY
HARTFORD • CONNECTICUT

AUTOMOTIVE INDUSTRIES
The Automobile

Reg. U. S. Pat. Off.
Published Weekly

Volume 79 Number 26

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AUTOMOTIVE INDUSTRIES

Vol. 79, No. 26
December 24, 1938

News of the Industry

The summary of automotive production activity for the week ending Dec. 24 appears on page 812 in this issue.

RETAIL AUTOMOBILE FINANCING

● The dollar volume of retail automobile financing for October, 1938 amounted to $67,252,459, according to statistics released by the Bureau of the Census, Department of Commerce. This is an increase of less than one-tenth of one per cent when compared with September, 1938; a decrease of 38.4 per cent as compared with October, 1937, and a decrease of 36.9 per cent as compared with October, 1936. The volume of wholesale financing for October, 1938 amounted to $63,669,584, an increase of 124.1 per cent when compared with September, 1938; a decrease of 52.3 per cent compared with October, 1937, and a decrease of 15.1 per cent as compared with October, 1936.

HOW'S BUSINESS?

● Sales of Buick cars in December are at a rate nearly 30 per cent over last year while this make continues to register fourth place in sales in the industry.

Sales during the first 10 days of the month were 5988 compared with 4633 in the same period last year, a gain of 29 per cent, while preliminary reports for the remainder of the month indicated a December Buick total of approximately 19,000 sales. In December last year 15,115 Buick cars were delivered at retail in the U. S.

Meanwhile, national registration statistics covering 23 leading cities show Buick in fourth place for the first half of December, being outregistered only by the three lowest priced makes of cars. The same records showed a slight gain in Buick registrations over the corresponding period of November.

● Domestic retail sales of GMC trucks during the first 10 days of December exceeded deliveries in any 10-day period during the last 13 months, according to J. P. Little, vice-president directing sales for the General Motors Truck & Coach division of Yellow Truck and Coach Mfg. Co.

"The 1939 series of GMC trucks which includes both gasoline and diesel powered units, has improved its sales position steadily ever since the announcement in November," Little said. "The last 10-day sales report shows an increase of 38 per cent over sales in the corresponding period of 1937. Unfilled retail orders, as of Dec. 10, stood 33 per cent above Dec. 10, 1937. Dealer orders placed at the factory so far for 1939 model trucks have risen 30 per cent beyond the total recorded at this time a year ago."

● Production schedules on the Lincoln-Zephyr currently total 750 units weekly according to a factory announcement, which adds that dealers' requirements for January delivery will equal the sum of November and December takings.

● Customer deliveries for the first 10 days of December topped the same period of a year ago by 92.8 per cent and the first 10 days of November by 3.4 per cent, general sales manager D. E. Ahrens of Cadillac-La Salle has announced.

Figures released show 1315 cars delivered this year against 683 in 1937 and 1270 in the first 10 days of November.

"We consider the report significant," said Mr. Ahrens, "because it continues the upward trend that gave last month a 30 per cent increase over the best previous November in our history."

Two other signs of expanding retail business were reported by Mr. Ahrens.

"We have had a notable gain in carload lot orders," he declared. "Many of these come from small dealers who were formerly unwilling to stock more than one car.

"In addition to our unusually large sales, November set an all-time record in customer deliveries at the factory—that is automobiles sold by dealers in other cities and called for in Detroit by the buyers. Normally the peak of this business is reached in May or June."

Production

Week's Output Falls Slightly To Estimated 91,200 Units

With retail deliveries of passenger cars showing continued strength through the early part of December, car and truck production figures are reflecting strong opposition to the seasonal factors which normally begin to show their effect by this time of the year.

Although total output for the week ending Dec. 24 is expected to show a slight drop from preceding weeks. According to a mid-week survey of factory schedules, the drop is less sharp than originally anticipated. To the current week's modification of schedules must also be added the influence of one day's less work with a majority of the producers who had been working five days going to a four-day week for the holiday period.

As a result, car and truck production for the week is estimated at approximately 91,200 units. It is expected that production for the final week of the month and year will show some further decline because of the loss of a day, but, in direct

(Turn to page 804, please)

AUTOMOTIVE INDUSTRIES this week represents the combined issues of Dec. 24 and Dec. 31, due to the unusual fact that there are 53 publication dates (Saturdays) in 1938, instead of the usual 52.

The next regular issue will appear on Jan. 7, 1939, as No. 1, Volume 80, of AUTOMOTIVE INDUSTRIES.

News of the Industry

CANADA'S NOVEMBER PRODUCTION

• November production of 17,992 automobiles in Canada was the best reported since May, and compares very favorably with 5774 motor vehicles in October and 16,574 in November, 1937. Totals for November include 15,423 passenger cars and 2569 trucks, making a grand total for the first 11 months this year of 147,472 units. During the corresponding period of a year ago 186,348 units were produced. Production of automobiles in Canada by months in 1938, and comparisons with 1937 follow:

	1938	1937
January	17,624	19,583
February	16,066	19,707
March	16,802	24,901
April	18,819	17,081
May	18,115	23,458
June	14,732	23,841
July	9,007	17,941
August	6,452	10,742
September	6,089	4,417
October	5,774	8,103
November	17,992	16,574
Totals	147,472	186,348

FARMERS TAKE MORE GASOLINE

• A tremendous increase in the use of gasoline on farms during the last three years is indicated by gasoline consumption figures recently made public by the United States Bureau of Public Roads. In 35 states for which data are obtainable the total increase in gasoline consumption for non-highway purposes, which means mostly farm use, amounted to 435,968,000 gallons, an increase of 50 per cent. In 1935 gallonage amounted to 903,866,000. In 1937 it rose to 1,349,834,000. In one state, Michigan, the rise was 127 per cent.

DISTRIBUTOR-DEALER COUNCILS

• First of a series of distributor-dealer councils was held by Hudson Motor Car Co. in Detroit last week. Twenty-four distributors and dealers, representing the six regional territories of the United States, attended the two-day business session which was conducted by William R. Tracy, vice-president in charge of sales, S. G. Baits, first vice-president and assistant general manager, and George H. Pratt, sales manager. Other Hudson officials who took active part in the meeting were W. A. James, director of advertising, Murray Northrup, chief engineer, and William R. Baker, manager of national used car sales.

FIELD MEN STUDY GM DIESEL

• During the past few months General Motors Truck & Coach field men have been receiving first-hand information pertaining to operation and maintenance of the new General Motors Diesel engine. Principles of operation were the basis of a series of two-week courses conducted by experienced Diesel engine instructors at the General Motors Institute, Flint, Mich.

Service managers of General Motors Truck & Coach zones and direct key dealers, and also coach special service representatives were relayed to Flint in five successive classes—beginning July, 1938. Lectures, sound pictures and laboratory work—coupled with a trip through the new General Motors Diesel Engine Plant—constituted the training media. Each man had the opportunity to completely dismantle and rebuild a Diesel engine and all accessories. Laboratory work was concluded with a series of dynamometer tests, providing an opportunity for adjustments under load, and observation of engine torque output at various speeds.

These courses are the beginning of an extensive Diesel service training program which will soon reach all General Motors Truck and Coach factory, zone and dealer service personnel through field educational meetings, factory publications and the extension of the General Motors Institute Training Course to include GMC dealer and fleet operator personnel.

RESEARCH IN GERMANY

VDI Verlag, Berlin NW7, has just issued Nos. 11 and 12 of Deutsche Kraftfahrtforschung im Auftrag des Verkehrsministeriums (*German Motor-Vehicle Research, at the Instigation of the Minister for Transport*). No. 11, of which Professor A. Thum and Dipl.-Ing. E. Bruder are the authors, deals with *"Risks of Fatigue Failures of Throated Sections of Shafts and Axles, and Their Reduction."*

Where anti-friction bearings are used on axle shafts, as in semi-floating axles, it is necessary to provide a shoulder on the shaft against which the inner race may abut. Such an offset forms a weak spot which is likely to result in fatigue failure. A fillet must be provided at the shoulder in any case, and it appears that the effect of the offset on the endurance of the shaft can be further reduced by using a slight undercut or relief in the shaft near the shoulder and by cold-working the surfaces of the shoulder and relief by means of a hardened steel roller. Reference is made in this connection to American work along the same lines reported by T. V. Buckwalter and O. J. Horger in Transactions of American Society for Metals, p. 229, Vol. 25 (1937). It is claimed that both the offset in the shaft and mounting of the inner race of the anti-friction bearing produce a notch effect, and that the notch effect (reduction of shaft endurance) of the two combined is not materially greater than that of one alone. A series of tests were carried through, with different steels and different designs of offset, fillet radius, etc., and the effects of the different factors on the endurance were determined.

No. 12, by Dipl.-Ing. Ludwig Huber and Dr.-Ing. Hanns Peter Zoeppritz, deals with "Plying and Cooling Tests on a Superpressureless Tire." The term "superpressureless" is somewhat puzzling, but what is meant is a cushion tire which, while having interior air chambers, is not inflated. The air chambers are comparatively large, and the walls of the tire are stiffened by interior circumferential and transverse ribs, every third one of the transverse stiffening members being a complete cross wall. The tests, it appears, were carried out in collaboration with the Continental Rubber Works of Hannover, with the object of developing a new type of tire. In the tests, specimens constituting one-sixth of a full tire were subjected to a rapid succession of deflections by means of a suitable mechanism. Data for load-deflection curves were obtained and from these the amount of energy absorbed in the tire for a given load was calculated. In the ply tests the temperatures at numerous points on the inside and outside of the wall of the tire were measured by means of thermo couples. The highest temperature was reached at about the middle of the side walls, where the plying effect naturally is greatest.

The tire is of such design that the interior chambers can be ventilated through small openings in the rim, and ventilation was found to reduce the temperatures materially.

Industrial Economics

Commerce Department Makes Bid for Bureau Recommended by FDR

The Commerce Department's bid for harboring the proposed new bureau of industrial economics, which President Roosevelt recommended last April as a means of bringing industrial production more into line with consumption, was made public in its annual report on Tuesday, just 20 days after the Federal Trade Commission had represented itself to the White House as being "fully implemented" with powers to collect and publish market information as a guide for business.

"The Department of Commerce," the report said, "is attempting to study many of these problems (of fluctuations in industrial activity, price trends, and changes in consumer demand) with the purpose of clarifying the general understanding of business operation and aiding business men in better administration of their own enterprises. Facilities for this work, however, are still woefully lacking."

Said the FTC in its report:

"The Federal Trade Commission is fully implemented with such expressly granted powers, but has not been able to use them effectively for lack of appropriations."

The Commission, which also recalled that it has been identified for many years with the proposal to collect business statistics as a method of cushioning severe changes of the business cycle, actually was given funds back in 1919 to start work in this direction but litigation halted its efforts and Congress cut off further funds. Many companies rebelled against the mandatory gathering of reports although the FTC's powers were subsequently upheld in the courts.

The Commerce Department had money appropriated during the fiscal year 1939 as a step in that direction but, out of $100,000 allocated, the bulk was impounded for other purposes. In its report last week, the Department listed construction and related durable goods industries as ones in which more research should be undertaken promptly for the purpose of appraising trends covering production, sales, inventories, credit, distribution costs, trade practices, price changes, and consumer needs.

In the meantime, rumors persist that the Administration will push for the so-called bureau of industrial economics early in the next

session of Congress. Objections to the FTC, however, may bar it from being the selected agency. Donald Richberg, White House adviser and a persistent advocate of such a bureau, has warned against either the FTC or the Justice Department performing the function on the ground that they are prosecuting arms of the Government.

It is Richberg who forecast that every industry in the country, without agreement among individual members, could improve their production schedules if the proper Government facilities were established. President Roosevelt said in his message to Congress last April that some Government bureau should collect and publish current statistical information regarding market conditions, thereby putting itself in a position to war against the dangers of temporary over-production and excessive inventories, as well as against the shortage and "bottleneck" conditions affecting business.

Yellow Truck & Coach

Some Historical Notes on the GM Truck & Coach Division

The history of General Motors Truck & Coach Division of Yellow Truck & Coach Co. was briefly sketched in a release issued on the occasion of the New York National Motor Truck Show.

In 1902 Max Grabowsky organized the Rapid Motor Vehicle Company in Detroit to build commercial motor vehicles. A single-cylinder delivery wagon was produced, and the first unit was sold to the American Garment Co. of Detroit. A total of 75 vehicles were built and sold during the first three years of the company's operations.

In 1905 the company, wishing to

(Turn to page 810, please)

Reo Suspends Operations

Manufacturing Discontinued Indefinitely Following Petition by Stockholders Requesting Receivership for Truck Company

Manufacturing operations at the Reo Motor Car Co. plants in Lansing were discontinued indefinitely on Dec. 16 following filing of a petition on Dec. 13 in the Ingham County Circuit Court by 20 stockholders requesting appointment of a receiver for the company. This step was followed by a petition for reorganization of the company under Section 77-B of the National Bankruptcy Act, filed on Dec. 17, by present officers of the company in the U. S. District Court in Detroit.

Judge Arthur F. Lederle, of the Federal court, has set Feb. 6 for a hearing to determine whether Arthur C. Brandt, Lansing industrial engineer named as temporary trustee by the court, shall be made permanent trustee. The Federal court action is said to take precedence over the receivership action in the State court.

It was announced in Lansing that the discontinuance of operations was partially due to the receivership action although a temporary shutdown would have taken place anyway during changeover for new models. At the time of closing it was indicated that operations might be resumed on Jan. 15, although the filing of the petition for reorganization under Section 77-B is now expected to have some effect in determining resumption date.

Events of the past week climaxed a long struggle for control of the company which came to a head last fall after a proxy fight which resulted in the resignation of Donald E. Bates as president and the naming of Rowland Campbell as president and general manager, and election of a new board of directors.

Thomas Campbell, brother of the president, was named chairman of the board and chief executive officer of the company, and this board headed by Thomas Campbell on Dec. 16 announced removal of Rowland Campbell from his post as president and general manager as well as the demotion of Howard Flogaus, chief engineer, from his post, although the latter was retained with the company.

The petition for 77-B reorganization was signed by Thomas Campbell and L. F. Jubenville, secretary and treasurer. Brandt, named by the Federal court as temporary trustee had been serving as temporary executive superintendent. The reorganization petition lists the company's assets at $12,523,000 as appraised last June with current liabilities of $571,250 and $10,000,000 in common stock, and charges that "through lack of proper management the company's working capital has been depleted to such an extent that it is unable to meet current obligations and has had to suspend operations."

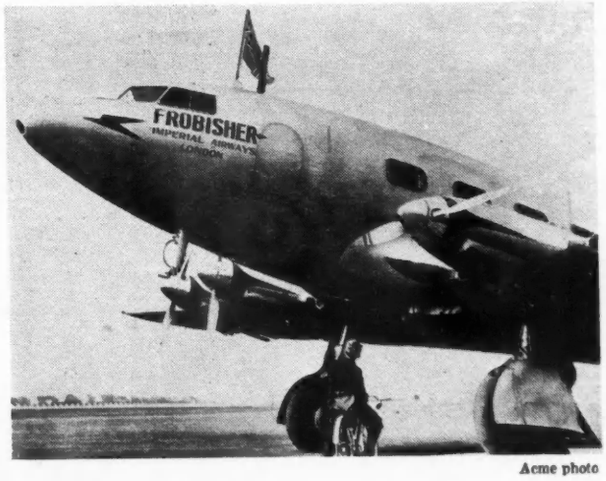
Machine Control

"Double Pump and Combination Valve Unit" Offered by Vickers, Inc.

Vickers, Inc., of Detroit, has placed on the market a "double pump and combination valve unit" for the control of machine tools. This unit can automatically vary its output to take care of either large or small volume requirements (rapid approach or rapid return and slow feed motions, respectively). It comprises two Vickers balanced vane pumps driven by a single shaft, the output of one pump being available to the hydraulic circuit under all conditions, while the other pump cuts in only when needed. When the output of the second pump is not needed the latter merely circulates the oil without having to overcome any pressure.

The drawing reproduced herewith shows the operation of the unit when only one pump delivers oil to the machine tool or press. Whenever the feeding action begins, pressure in the system is built up by the introduction of a flow-control metering

(Turn to page 806, please)



Acme photo

NEWCOMER

The "Frobisher," latest addition to the Imperial Airways' European fleet, shown at Croydon Airdrome. It is, its makers claim, the world's most perfectly streamlined plane. It has accommodations for 22 passengers, wing span of 105 ft., weight of 13 tons.

News of the Industry

PLANT EXPANSION

● Globe Steel Tubes Co., Milwaukee, Wis., manufacturer of seamless tubing for a wide variety of purposes, including automotive torque tubes, frame cross members, and steering columns, is completing an extensive plant rehabilitation program representing an investment of upwards of $200,000. Besides rearranging machinery, it has installed considerable new equipment, including a 2-ton per hour, controlled atmosphere annealing furnace, one of three in the industry.

A new compound for use in drawing stainless steel, entirely eliminating the use of lead, has been developed in this company's laboratory.

● The Detroit office of the Fellows Gear Shaper Co. has been moved to larger quarters from 616 Fisher Building to 814 Fisher Building.

● Boeing Aircraft of Canada, Ltd., a subsidiary of Boeing Airplane Co., has filed a request with the Vancouver, B. C. civic airport committee to lease 28 acres of land at the city-owned Sea Island Airport for the erection of a new airplane manufacturing plant.

The company has offered to pay a total of $49,000 for the property over a period of 20 years, the committee reported.

● Allis-Chalmers Mfg. Co., Milwaukee, has resumed quantity output of its low-priced farm tractor at its main works in West Allis in preparation for spring demand. Work is being rushed on an $800,000 enlargement of its plant at La Porte, Ind., where it manufactures small harvesting combines designed for use with the small tractor.

● Fleet Aircraft Corp., Ltd., Toledo, Ohio, has begun construction of a $100,000 addition to its Fort Erie, Ont., plant which will double capacity and bring a corresponding increase in employment.

The company has been selected as one of the dozen participating companies supplying the British government with bombers. Additional capital shares will be issued to finance the expansion program.

ACTIVITIES IN THE OIL FIELD

● More than 400 oil operators met at Bakersfield, Cal., Dec. 15 for discussion of curtailment of petroleum production and proposals were heard that every effort be made to have the California oil industry reduce output to the 600,000 barrel level by Christmas.

Dana Hogan, president of the San Joaquin Valley Oil Producers Association which called the conference jointly with the Independent Oil Producers Agency, said that with storage facilities glutted, a break down of the California price structure and possible Government regulation loomed unless output was curtailed voluntarily in the immediate future.

● C.P. Watson, vice-president of the Seaboard Oil Co., was elected president of the California Oil Association, it was announced this week. L. P. St. Clair, chairman of the Union Oil Co., and R. E. Collom, vice-president of Continental Oil Co., were reelected vice-presidents. H. L. Westbrook, vice-president of Belridge Oil Co., was reelected treasurer for his 14 successive term. F. E. Foster continues as managing director and D. S. Kilgour as assistant manager.

Directors elected for 1939 include: S. Belither, president Shell Oil Co.; W. H. Berg, president, Standard Oil Co. of California; E. C. Bolton, general superintendent, Ohio Oil Co.; R. A. Broomfield, executive vice-president, Barnsdall Oil Co.; C. R. Gallagher, president, Western States Gasoline Corp.; Dana Hogan, president, Hogan Petroleum Co.; H. E. Howard, president, Howard Supply Co.; W. F. Humphrey, president, Tide Water Associated Oil Co.; C. A. Johnson, president, Holly Oil Co.; C. S. Jones, president, Richfield Oil Co.; W. M. Keck, president, Superior Oil Co.; R. B. Lloyd, President Lloyd Oil Corp.; A. B. Macbeth, president Southern California Gas Co.; A. C. Mattoi, president, Honolulu Oil Corp.; William Reinhardt, vice-president, Union Pacific Railroad; F. C. Ripley, manager, Chanslor-Canfield Midway Oil Co.; T. H. Webb, vice-president, The Texas Oil Co.; A. L. Well, president, General Petroleum Corp. of California.

● After a slackening in Japanese demand for California oil for a few months, that country again is increasing its takings and tankers now are loading nearly every day. It is estimated by the industry that Japan will buy during the next six months up to 10,000,000 barrels of California oil, most of it being destined for naval reservoirs.

IMPROVED STATISTICAL SERVICE

● Announcement has been made by the Department of Commerce that as the result of recommendations by a committee appointed by former Secretary Roper to consider possible improvements in the current business statistical service of the Department, the Bureau of the Census will now be responsible for the collection, tabulation and release of the basic tables on current statistics of retail and wholesale trade and manufacturing, while the Bureau of Foreign and Domestic Commerce will analyze, interpret and publish the final reports. Previously, each of the Bureaus performed both functions in certain fields.

The new arrangement applies only to business and industrial statistics gathered at intervals under one year and does not affect the periodic industrial and business censuses. Special studies conducted by either Bureau do not come within the scope of the policy change.

Production

(Continued from page 801)

contrast with 1937, when most producers closed down between Christmas and New Year, practically all expect to be in operation three or four days next week.

Also, in direct contrast with last year, is the used car inventory situation. Although field reports indicate an increase of used car stocks in dealers' hands, the totals have been estimated at less than two-thirds of what they were last year, while new car stocks in dealers' hands are approximately one-half of what they were at the same time in 1937.

Retail sales reports covering the first 10 days of December indicate producers generally showing an increase over the same period in November, while increases over the same period a year ago range from 27 to 64 per cent among the manufacturers making figures available.

On the basis of current strength in retail sales, informed observers now believe that the seasonal drop anticipated for January will not be as great as originally expected, and that the influences of Spring purchasing will begin to be reflected in augmented production schedules before the end of February.

Although showing a slight recession from the previous week because of the four-day week in some divisions, General Motors continued to head the production parade for the week ending Dec. 24, with an estimated total of approximately 37,000 cars and trucks. Ford followed with an estimated total for all divisions of approximately 23,000, and Chrysler divisions were next with more

Passenger Car and Truck Production

November passenger car and truck production in the U. S. and Canada exceeded the total for the same month a year ago by almost 4 per cent to aggregate 390,350 units. The October, 1938, total was topped by 175,054 units, an increase of slightly more than 80 per cent.

	November 1938	October 1938	November 1937	Eleven Months 1938	Eleven Months 1937
Passenger Cars—U. S. and Canada					
Domestic Market—U. S.	295,366	171,371	269,580	1,504,929	3,430,731
Foreign Market—U. S.	24,978	16,123	25,748	170,050	240,773
Canada	15,423	5,412	13,793	109,563	138,247
Total	335,767	192,906	309,121	1,784,542	3,809,751
Trucks—U. S. and Canada					
Domestic Market—U. S.	38,719	16,697	48,969	303,946	637,459
Foreign Market—U. S.	13,295	5,331	15,758	122,284	173,777
Canada	2,569	362	2,781	37,909	48,101
Total	54,583	22,390	67,508	464,139	859,337
Total—Domestic Market—U. S.	334,085	188,068	318,549	1,808,875	4,068,190
Total—Foreign Market—U. S.	38,273	21,454	41,506	292,334	414,550
Total—Canada	17,992	5,774	16,574	147,472	186,348
Total—Cars and Trucks—U. S. and Canada	390,350	215,296	376,629	2,248,681	4,669,088

than 18,000. Nash remained at the head of the independents with a slight gain over its output for the previous week, with Studebaker, Packard and Hudson showing only slight downward revisions.—J. A. L.

"Birth Certificate"

Uniformity in State Certificate of Title Laws Urged at Conference

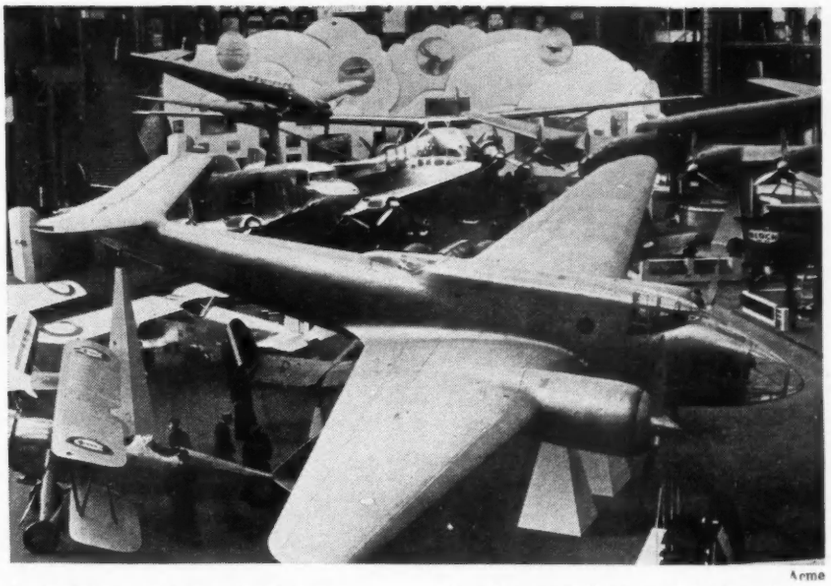
The importance of uniformity in State "Certificate of Title" laws, and standardization of administrative forms and rules in connection therewith, was stressed at a conference of the representatives of a number of national trade associations of the motor vehicle industry held in New York, Dec. 18, under the auspices of the Motor Vehicle Industries Conference.

To aid in attaining desirable uniformity and clarity in States where such legislation may be proposed during 1939 legislative sessions, the Motor Vehicle Industries Conference was asked to prepare a suggested model law and standard forms to be used when State legislation seeks to curb such practices as "bootlegging" and "multiple financing" by requiring the manufacturer or importer of a motor vehicle to furnish a "manufacturer's certificate of title," sometimes referred to as the motor vehicle's "birth certificate," to supplement and be integrated with the "owner's certificate of title."

At the present time 28 States have "owner's certificate of title" laws, but only Ohio requires a "manufacturer's certificate of title" or "birth certificate." Arizona and Wisconsin seek to attain the same results by requiring a "certificate of newness" issued by the motor vehicle manufacturer.

The group, which represented motor vehicle manufacturers, dealers, sales financiers, insurers, equipment manufacturers, highway trans-

(Turn to page 808, please)



Acme

PARIS AIR SHOW— The Liore et Olivier night bombardment plane, powered by two Gnome-Rhone engines, on exhibit at the sixteenth annual Aeronautical Exposition, which was held recently at the Grand Palais, Paris, France. The plane is capable of a speed of 500 km. per hr. (312.5 m.p.h.)

Another Profit Sharing Plan

Counsel for Senate Committee Announces Formula Which May Be Offered to Industry on Voluntary Basis

A profit-sharing plan embodying desirable features of all operating systems analyzed by the Senate Profit Sharing Committee may be offered on a voluntary basis to automobile, steel, machinery and other manufacturing industries as a means of assuring amicable labor relations over a period of years.

The formula, announced by Donald Despain, counsel for the Senate Committee which, last week, concluded hearings on the possibility of giving Government tax concessions to firms adopting a profit-sharing system, proposes joint contributions by employers and employes to an irrevocable trust fund to be established by each firm participating. Retirement benefits would be paid all contributing workers from the trust fund. Interest on joint contributions, according to tentative plans, would be used in emergencies to strengthen pay rolls.

It was emphasized, however, that the plan offered would not necessarily be contained in any bill to be drafted by the Committee but rather would be offered to industry purely on a voluntary basis.

At the close of the hearings last week, Senator Vandenberg, committee chairman, described incentive taxation as one of the "Most encouraging instrumentalities" to stimulate productivity and profits and forecast that the idea in some form will find its way into the next Federal tax law.

He conceded that the novelty of the idea properly calls for "prudence and caution" but said the necessity of it calls for "early experiments."

Whether the tax incentive principle will be proposed in a separate bill or as a part of the new tax bill, it is believed that the legislation stands little chance of success. Testimony before the committee indicated that business is divided on the matter, and that organized labor opposes the plan. Vandenberg, being a Republican, conceivably would have difficulty mustering sufficient support for the measure to assure passage.

Monthly Motor Vehicle Production—U. S. and Canada

	Passenger Cars		Trucks		Total Motor Vehicles	
	1938	1937	1938	1937	1938	1937
January	168,890	324,191	58,240	74,995	227,130	399,186
February	151,133	310,961	51,456	72,939	202,589	383,900
March	186,341	423,006	52,257	96,016	238,598	519,022
April	190,111	452,907	48,022	100,324	238,133	553,231
May	168,599	443,412	41,584	96,965	210,183	540,377
June	147,545	429,333	41,854	91,820	189,399	521,153
July	112,114	372,913	38,330	83,996	150,444	456,909
August	61,687	317,270	35,249	87,802	96,936	405,072
September	69,449	120,597	20,174	55,033	89,623	175,630
October	192,906	306,040	22,390	31,939	215,296	337,979
November	335,767	309,121	54,583	67,508	390,350	376,629
December	.....	258,769	.....	88,117	.....	346,886
Total	.....	4,068,520	.....	947,454	.....	5,015,974

News of the Industry

WHAT ARE THEY DOING?

W. K. HYSLOP has been appointed general manager of the Massey-Harris Co., Racine, Wis., manufacturers of tractors, agricultural implements and other power products. He succeeds **O. H. SHENSTONE** who has been advanced to vice-president. Mr. Hyslop formerly was general manager of the company in Europe. At one time he was assistant European manager for the Chrysler Corp., and later general European manager of the Ford Motor Co.

FRANK A. FREY has been elected president and treasurer of the Geuder, Paeschke & Frey Co., Milwaukee, Wis., manufacturer of metal stampings and widely known in the automobile industry. He succeeds the late Charles Paeschke, Jr. **HENRY F. MILLMAN** has been named executive vice-president and general manager. He has been vice-president in charge of production. **AUGUST K. PAESCHKE**, son of the late president, continues as secretary.

GEORGE F. BAUER, export manager of the Automobile Manufacturers Association, departed recently via air to attend the Eighth International Conference of American States at Lima, Peru. He will also attend, as a member of the U. S. Delegation approved by President Roosevelt, the Third Pan American Highway Congress at Santiago, Chile, Jan. 13-25.

JAMES S. MARVIN, manager of the traffic department of the Automobile Manufacturers Association, has been appointed a member of the special committee of the National Industrial Traffic League to consider the railroad program. The committee, representing the national organization of shipping interests, will meet at intervals with a similar committee of railroad presidents, to exchange views on the needs of shippers in connection with proposals that the railroad executives make toward the betterment of their condition.

WILLIAM A. BRUSH, of the Brush Engineering Association and pioneer in motor car development, has been reelected head of the Automobile Club of Michigan.

V. H. DEARLE has been named assistant Detroit district manager for the Carboloy Co., Inc.

WALTER A. OLEN, president and general manager of the Four Wheel Drive Auto Co., Clintonville, Wis., addressed the Washington section of the Society of Automotive Engineers on Dec. 13.

J. D. KERVIN has been appointed organization and analysis manager of General Motors Products of Canada, Ltd., Oshawa, Ont.

FRANCE'S MOBILIZED CARS

• Should the French Government decide to purchase cars requisitioned from owners during the September mobilization, the market for new cars would be expanded, a report to the Commerce Department points out. Many of the car owners, the report says, are declining to accept their automobiles because of alleged damages during the mobilizations period. They are urging the Government to retain the cars and pay for them at a value fixed by the Journal Officiel.

The same report says that sales of passenger cars in Northern France continued at a satisfactory level during July and August but fell off sharply during September. The demand for passenger cars in Western France during the third quarter compared favorably with the comparable quarter in 1937. July and August demand was good but there was no material increase in the demand for American cars during the third quarter.

The report listed high import duty and the low exchange rates of the franc as the major factors continuing to limit the sales of American automobiles.

RECORD FOR OLDS DEALERS

• Oldsmobile dealers sold 5077 new sixes and eights throughout the United States during the first 10 days of December, the second largest sales for that period in the entire history of the company. This compares with sales of 3090 new Oldsmobiles during the same period of 1937 or a gain of more than 64 per cent.

DENMARK IMPORTS ABOVE '37

• Imports of automobiles into Denmark for the third quarter of 1938 totaled 6658 units, an increase of 25 per cent over the corresponding period in 1937 but a decrease of 13 per cent below the preceding quarter of the current year, according to a report to the Department of Commerce.

Complete units numbered 1467 and knocked-down vehicles totaled 5191 units in the third quarter of this year. In the preceding quarter complete units numbered 881 and knock-down vehicles 6753. Re-exports of units assembled in Denmark during the third quarter totaled 2408 compared with 3024 units in the preceding quarter and 2336 units in the third quarter of 1937.

Imports for the first nine months of the year totaled 15,996 units as compared with 17,696 units in the first nine months of 1937, an increase of about 14 per cent.

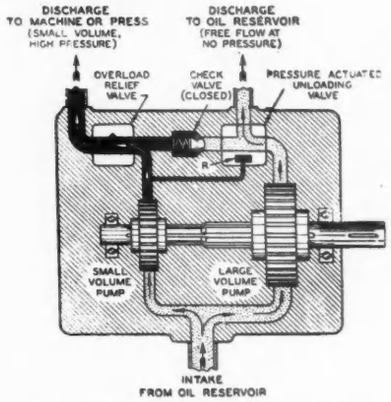
Machine Control

(Continued from page 803)

valve in the active circuit. This immediately builds up pressure in the unloading-valve chamber R, so that the entire volume of the second pump is allowed to return directly to the tank, without having to overcome any resistance.

During traverse motions the pressure in the system is relatively low. Low pressure in chamber R causes the delivery of the second pump to be discharged together with that of the first pump, and the combined volume, therefore, is available for low-pressure traverse motions.

The unloading valve may be adjusted from the outside, so that the delivery of the second pump may be discharged to the tank at the desired pressure.



Sectional view of Vickers double-pump-and-combination-valve unit

BUSINESS IN BRIEF

Written by the Guaranty Trust Co., New York

Apparent steadiness remained the ruling feature of general business last week, with the usual seasonal factors variously affecting particular branches of production and trade. The activity index compiled by the *Journal of Commerce* stood at 90.7 for the week before, ended Dec. 10, recording a fractional decline from the revised figure of 91.1 for Dec. 3, and comparing with 78.2 for the corresponding date last year.

With Christmas shopping dominating the retail trade scene last week, expansion of sales by from 10 per cent to 30 per cent was noted by Dun & Bradstreet. Producers and primary distributors were unable to fill many of the rush orders received. Federal Reserve Board data for some 265 department stores throughout the country showed aggregate sales for the week ended Dec. 10 only two per cent below the corresponding 1937 level.

The output of electricity by the power and light industry in the week ended Dec. 10, the largest production this year to date, was only slightly less than the record figure reported in September of last year.

News of the Industry

Railway freight loadings in the same week, 619,340 cars, marked a resumption of the downward trend which had been interrupted in the preceding week but slightly exceeded the corresponding figure last year.

Estimated average daily output of crude oil in the week ended Dec. 10 was 3,245,100 barrels, or 21,450 barrels more than the average for the preceding week. Current daily requirements amount to 3,305,800 barrels, according to the computation by the U. S. Department of the Interior.

The production of soft coal in the same week was at an average daily rate of 1,350,000 tons, as compared with 1,417,000 tons for the preceding week.

Reported lumber production in the week ended Dec. 10 was approximately the same as that in the preceding week, while new business and shipments were at lower levels. New orders exceeded by 42 per cent the corresponding 1937 business.

The consumption of cotton, exclusive of linters, by the country's mills in November amounted to 596,289 bales, as compared with 542,778 bales in October. This is the largest monthly consumption since September, 1937.

Professor Fisher's index of wholesale commodity prices for the week ended Dec. 17 remained unchanged at 79.8.

Member bank reserve balances increased $67,244,000 in the week ended Dec. 14, with estimated excess reserves advancing $40,000,000 to a new peak of $3,480,000,000. Total bills discounted by the Federal Reserve banks increased $954,000, with industrial advances showing no important change.

IN THE AIRCRAFT FIELD

● The Secretary of Labor has issued an order fixing a minimum wage for employes in the aircraft manufacturing industry of 50 cents an hour—10 cents an hour less than the rate recommended by the Public Contracts Board last June.

The Secretary's order, which becomes effective Dec. 29, will be applicable to all industry members contracting with the Government but specifically excludes manufacturers of light or commercial aircraft and related parts and manufacturers of accessories, radio equipment and parachutes. The order noted that the Government makes few purchases from the light or commercial branch of the industry and that this branch pays a lower minimum wage.

Apprentices may be employed at lower rates, according to the order, provided their employment conforms to the standards of the Federal Committee on Apprenticeship.

Protests to the Board's recommendations last June were followed by a public hearing in September at which industry members suggested various changes to be made in the recommendations before approval was given.

● With plant now operating on a five day week, one-shift basis in addition to a skeleton night force, Lockheed Aircraft Corp., with its unfinished business in excess of $30,000,000 is preparing to increase operations shortly, to a seven day, two-shift basis eventually. While it will take some time to attain maximum production schedule, the company expects that probably by early spring it will be able to turn out a minimum of 10 ships weekly on its British government order for 200 ships and the 50 ordered by the Australian government.

● At a recent meeting of the Aircraft Precision Products, Inc., J. Bert Easley was elected secretary-treasurer, and T. M. Deal was made a member of the board of directors. Other members of the board of directors reelected include F. W. Conant, assistant general manager of Douglas Aircraft Co.; Robert E. Gross, president of Lockheed Aircraft Co.; Charles T. Leigh, vice-president of consolidated Aircraft Co.; R. W. Miller, general manager of Vultee division of Aviation Manufacturing Co., and R. J. Wig, vice-president of Figer California Co.

The company was organized in February of this year, principally for the manufacture of hydraulic units for the aircraft industry.

Deliveries of the company for November amounted to $31,164, bring the total deliveries since shipments were first started last May to $110,997.

● Earl Herring, trustee for Kinner Airplane & Motor Corp., in process of reorganization under the Bankruptcy Act, has received an offer from unnamed parties for purchase of the company's assets for $200,000, excluding some $25,000 of cash and accounts receivable. The offer was revealed with the request for a court order to permit sale of the assets.

A hearing on the matter will be held before United States District Court Judge Harry A. Hollzer on January 4 at Los Angeles.

● Net sales of Solar Aircraft Co., manufacturers of exhaust manifolds and other aircraft parts, for the half year ending November 12, totaled $372,355, a 70 per cent increase over the same period in 1937. Net profits for the period, after provisions for taxes were $4,996 which is equal to 24 cents per share on the 169,318 shares of par value common stock outstanding.

● Deliveries made by Douglas Aircraft Co. during the three months ended Nov. 30 totaled $5,000,000, the lowest for any quarter this year. The decline, which had been expected, was due largely to slow deliveries during September when the company was starting delivery on the B-18-A bombardment planes for the Army. Output for the three months was confined almost entirely to delivery on the bombardment contract. Net sales for the last quarter brings the total for the year to $27,900,000, the largest in the history of the company, and comparing with $20,950,000 for the preceding year.

● With unfilled orders at a new high of $375,000, Ryan Aeronautical Co. is well ahead of scheduled deliveries under current contract, according to Claude Ryan, president.

Contracts on hand include the two largest orders ever let for exhaust manifold equipment, amounting to $200,000, and a quantity of Ryan S-T-M military training planes for export to Central America.

U. S. New Passenger Car Registrations and Estimated Dollar Volume by Retail Price Classes*

	NEW REGISTRATIONS			ESTIMATED DOLLAR VOLUME		
	October	Ten Months		October	Ten Months	
		Units	Per Cent of Total		Dollar Volume	Per Cent of Total
Chevrolet, Ford and Plymouth	66,769	859,552	59.91	$50,600,000	647,700,000	52.01
Others under $1000	22,962	310,416	21.64	21,000,000	283,600,000	22.77
$1001-$1500	27,489	247,735	17.27	30,600,000	276,500,000	22.21
$1501-$2000	1,162	10,265	.72	1,900,000	17,500,000	1.41
$2001-$3000	516	5,788	.40	1,400,000	15,500,000	1.24
$3001 and over	59	933	.06	300,000	4,500,000	.36
Total	118,957	1,434,689	100.00	$105,800,000	$1,245,300,000	100.00
Miscellaneous	96	1,205				
Total	119,053	1,435,894†				

† Data from Wisconsin not complete.

* All calculations are based on delivered price at factory of the five-passenger, four-door sedan, in conjunction with actual new car registrations of each model. The total dollar volumes are then consolidated by price classes.

MOTOR BOAT MEN TO MEET

● More than a dozen national and local boating organizations will hold their annual meeting during the National Motor Boat Show to be held in New York, Jan. 6-14. The Eastern Intercollegiate Outboard Association starts the meeting calendar with a council luncheon the first Saturday of the show, Jan. 7, and the Waterway League of America is scheduled to convene on the following Monday.

During the week meetings will be held by the National Outboard Association, the National Outboard Racing Commission, the American Power Boat Association Racing Commission, the Regatta Circuit Riders Club, the National Association of Engine and Boat Manufacturers, the New Jersey Board of Commerce and Navigation and the Raritan Bay Yacht Racing Association.

Saturday, Jan. 14, the concluding sessions of the eight day run, will be featured by the annual meeting of United States Power Squadrons delegates, to be followed that evening by the organization's Silver Anniversary Ball.

News of the Industry

REPLACEMENT PARTS SALES

• Sales of replacement parts by members of the National Automotive Parts Association during the first 10 months of 1938 were four per cent ahead of the same period a year ago, Henry Lansdale, general manager of the association, told members at their annual meeting in Chicago on December 14.

Present officers and directors of the association were reelected including: A. F. Baxter, Unit Parts Corp., Buffalo, president; Carlyle Fraser, Genuine Parts Co., Atlanta, vice-president; and Lansdale, general manager. Additional warehouse representatives named on the board of directors were E. K. Moseley, NAPA Richmond Warehouse, Richmond, Va., and J. R. McCoy, Quaker City Motor Parts Co., Philadelphia. Harry Seith, American Brakeblok division, American Brake Shoe & Foundry Co., Detroit, was added as a manufacturer director.

INDUSTRIAL PAYROLLS

• Industrial payrolls in Wayne County, Michigan, heart of the automotive industry, were increased by 13,000 persons between Dec. 15 and Nov. 30, according to figures released by the Detroit Board of Commerce. As of Dec. 15 there were 192,000 more persons receiving pay checks than at the end of July.

The Board's industrial employment index passed the 100 mark and stood at 100.9 on Dec. 15. Base of the index is the monthly employment average of 1923-25. On Nov. 30 the index stood at 97.6.

Total employment as of Dec. 15 was 364,000 as compared with 351,000 on Nov. 30 and 367,000 on Dec. 15 a year ago. However a year ago employment was falling off while this year it has increased consistently since July and is expected to remain at approximately current levels for the remainder of the winter.

CANADA'S 1937 SALES

• There were 413,043 motor vehicles retailed in Canada for $245,277,623 in 1937. Included in these totals were 141,881 new vehicles which sold for $157,671,890 and 271,162 used vehicles at $87,605,733. Ontario province with 35.5 per cent of the Dominion population had 47.7 per cent of all motor vehicles registered in the country in 1936, and took 49.7 per cent of the total sales for 1937.

40 Years Ago

• The work of introducing motor vehicles in new countries where railroads do not exist and where the traffic would not as yet justify the construction of a railroad has been begun in France by the shipment to a part of Senegal, Africa, of two petroleum wagons, which are to be used in establishing the first regular mechanical transportation route in that country. The result has been so encouraging that other vehicles, steam or petroleum, are being sent to different parts of the African continent to develop its resources and pave the way for railroads.

From *The Horseless Age*, Dec., 1898.

ADVERTISING NEWS NOTES

• With a talent list that includes some of the outstanding names in radio, the Ethyl Gasoline Corp. will go on the air Jan. 12, sponsoring a 45-minute show called "Tune-Up Time." The program will be broadcast over a coast-to-coast network of 63 Columbia Broadcasting System stations every Thursday night at 10 o'clock Eastern Standard Time.

• The first Business-Consumer Relations Conference on Advertising and Selling Practices in the history of American business will take place in Buffalo, N. Y., June 5 and 6, 1939, under the auspices of the National Association of Better Business Bureaus with the cooperation of business, consumer, government and educational organizations.

HOUDAILLE-HERSHEY DIVIDEND

• Houdaille-Hershey Corp. has declared the regular quarterly dividend of 62½ cents per share on its Class A No Par Value stock, payable Jan. 3, 1939, to stockholders of record at the close of business on Dec. 27, 1938.

TO BUILD THE "AVERAGE CAR"

• The Bureau of Labor's most recent statistics show that the average car requires 5.7 man-weeks to build, which is 1½ man-weeks more than in 1929.

CONVENTIONS AND MEETINGS

SAE Annual Meeting, Detroit....Jan. 9-13

SHOWS AT HOME AND ABROAD

Grand Rapids, Mich., Automobile Show .....Jan. 2-7
National Motor Boat Show, New York, Jan. 6-14
Seattle, Wash., Automobile Show, Jan. 9-15
Belgium, Brussels, Automobile and Bicycle Salon ..... Jan. 11-22
Berlin, Germany, Automobile Show, Feb. 17-March 5
A.S.T.E. Machine and Tool Progress Exhibition, Convention Hall, Detroit .....March 14-18
Yugoslavia, Belgrade, Automobile Salon .....April 1-8
Great Britain, London, Automobile Show .....Oct. 12-21
Great Britain, London, Commercial Automobile Transportation Show, ... Nov. 2-11
Great Britain, Glasgow, Scotch Automobile Show .....Nov. 10-18
Italy, Milan, Automobile Salon, Oct. 25 to Nov. 11

"Birth Certificate"

(Continued from page 805)

porters and others, took no stand regarding the relative merits or desirability of such laws; but strongly urged that those favoring such State legislation give serious consideration to the necessity for uniformity in order to insure economy and efficiency if such legislation should be adopted in several States.

Standards for Knock-Rating Tests

During the past 10 years, normal heptane and the isooctane known as 2, 2, 4-trimethylpentane have come to be accepted internationally as the primary standards of reference for knock-rating of automobile and aircraft fuels. Some years ago the National Bureau of Standards was asked by the Cooperative Fuel Research Committee to investigate these materials and prepare specifications sufficiently rigid so that acceptable supplies would not differ from perfectly pure material by more than one-tenth of an octane unit. The difficulty of the problem may be judged when it is stated that this is only one-twentieth of the least variation in knock which can be detected by a trained driver in a car.

After all of the detectable impurities in isooctane had been found and studied, a report on the work was issued in September, 1937. Among the properties of the two hydrocarbons that were determined were their densities, their refractive indices for light of a specified wave length, their boiling and freezing points. The specialists of the bureau are satisfied with the degree of purity achieved in the preparation of isooctane, but hope to be able to prepare heptane in a still greater state of purity than is possible at present.

Ourselves and Government

Steel Men Protest Recommendations of Public Contracts Board for Minimum Wage of 62.5 Cents in North and 45 Cents in South

A weekly check list of legislative, executive and judicial actions affecting the automotive industries. First appeared in June 25 issue, p. 831. Corrected to Dec. 22.

FEDERAL TRADE COMMISSION

FAIR TRADE PRACTICE rules for retail automobile dealers, introduced at public hearings during last NADA meeting in December (see A. I., April 30, 1938), are expected to be submitted to the Commission shortly for approval. Completion of work on several pending cases before the FTC's Trade Practice Division will enable the division to start where it left off several months ago on the automobile rules.

SIX PER CENT CASE. Commission continues to defer setting final argument in the Ford case. Briefs from the FTC and the company are in. In the GM case, the company has filed its brief. FTC due to file its brief Dec. 30. Cases involve FTC allegation that companies engaged in false and misleading representations in advertising financing plans.

FOB PRICE CASE. Hearings on the Ford case started Nov. 29, have since been

recessed and may continue in Washington. The proceeding involves Commission charges that price advertising is misleading because of failure to include standard equipment in the advertised price. GM brief already filed, and hearings expected to start sometime in January.

VS. G-M. Alleged unfair competition and practices tending to create monopoly in the sale of automobile parts, accessories and supplies. Hearings continued at Brooklyn. John L. Hornor, trial examiner; Everett F. Haycraft, FTC attorney.

DEPARTMENT OF LABOR

Members of the steel industry protested at oral arguments before the assistant secretary of labor early this week that the recommendations of the public contracts board to establish a minimum steel wage of 62.5 cents in the North and 45 cents in the South are neither legally nor economically justifiable.

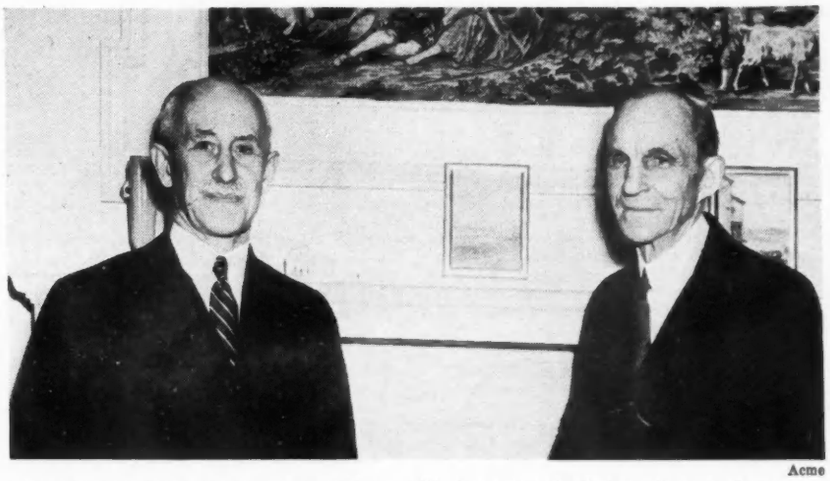
NATIONAL LABOR RELATIONS BOARD

Order and stipulation requiring Radcliff Motor Co., Kansas City, Chrysler and DeSoto dealer, to reinstate with back pay and full seniority 15 employes, which, the board said, were admittedly discharged because of membership in and activities on behalf of UAW. In addition the company agreed, and the board ordered it to bargain hith the union upon request.

NLRB has announced certification of International Union, UAW No. 12, as the exclusive collective bargaining agency for production and non-production factory employes of the Electric Auto-Lite Co., Toledo, Ohio. At the same time the board certified the Pattern Makers' Association of Toledo as the sole bargaining agency for the company's pattern makers. Earlier the board had certified Mechanics Educational Society of America, Local No. 4, as the sole representative for all employes in seven departments. In latest order, upon exceptions filed by the union, the board included the MESA unit tool inspectors, and upon basis of a stipulation excluded certain supervisory employes.

William Spindler

William Spindler, 48, production manager of the Harley-Davidson Motor Co., Milwaukee, Wis., maker of motorcycles, died recently.



Acme

FIRST FLIGHT—Orville Wright (left) who made the first successful flight by man when, at Kill Devil Hill, Kitty Hawk, N. C., he maneuvered his "Bird contraption" into the air for a sustained hop of 57 seconds is shown with Henry Ford on the occasion of the thirty-fifth anniversary of Wright's flight which was celebrated Dec. 17.

Automotive Metal Markets

Near Completion of Low-Price Commitments and Automobile Plant Pressure for Shipments Encouraging Elements for Steel Mills

Automobile manufacturers urged sheet and strip mills this week to speed up shipments of cold rolled material. With their bookings at prices below those now quoted rapidly nearing completion and their automotive customers pressing for shipments, steel producers confidently look for a fresh buying movement to develop early in the new year. In some steel products firmer market conditions have developed, especially so in bolts and nuts, one of the largest producers of these specialties having announced that all concessions from published quotations have been withdrawn and henceforth prices will be quoted firmly on the basis of published figures.

The market for carbon and alloy steel bars is also firm and there has been quite a little business placed for first quarter shipment. Developments over the next few weeks in the market for flat rolled steels will be watched with more than the usual interest. Leading producers have made it clear that they do not intend to be undersold and the smaller mills are just as determined to get what they consider a fair slice of the business overhanging the market.

Christmas is one of the steel industry's recognized holidays and this week's decline in the rate of employed ingot capacity, which has dropped to 51.7 compared with 57.6 per cent last week, must be read in the light of shutdowns, which in the case of some mills will last from Friday evening to Tuesday morning.

With the exception of lead, all non-ferrous metals have turned dull, marking time over the holidays, a $2 per ton advance in the price of lead resulted from better buying by storage battery manufacturers. Under better export demand copper has turned a shade firmer, but spot electrolytic in the outside market is still quoted around $15 a ton below producer's quotation. Curtailment of output is looked for beginning with the new year. After dipping below 46 cents, spot Straits tin regained that level.—*W. C. H.*

Passenger Car Production by Wholesale Price Classes

(U. S. and Canada)

Eleven Months 1938 and 1937 Compared

	Eleven Months		Per Cent Change	Per Cent of Total	
	1938	1937		1938	1937
Under $750	1,569,835	3,566,354	− 56.0	87.97	93.61
$751-$1000	187,922	200,599	− 6.0	10.53	5.27
$1001-$1500	21,495	28,370	− 24.0	1.20	.74
$1501-$2000	3,172	10,625	− 70.2	.18	.28
$2001-$3000	1,772	3,534	− 49.8	.10	.09
$3001 and over	346	269	+ 28.8	.02	.01
Total	1,784,542	3,809,751	− 53.1	100.00	100.00

Truck Production by Capacities

(U. S. and Canada)

	Eleven Months		Per Cent Change	Per Cent of Total	
	1938	1937		1938	1937
1½ Tons and less	430,237	800,203	− 46.2	92.70	93.12
2 to 3 Tons	17,213	35,231	− 51.1	3.71	4.10
3½ Tons and over	8,637	12,756	− 32.2	1.86	1.48
Special and buses	8,052	11,147	− 27.7	1.73	1.30
Total	464,139	859,337	− 46.0	100.00	100.00

News of the Industry

NEW BOOKS

THE INTERNAL-COMBUSTION ENGINE, *by C. Fayette Taylor and Edward S. Taylor, professors at Massachusetts Institute of Technology. Published by International Textbook Co., Scranton, Pa.*

This book differs from most others on the same subject in that, instead of discussing the individual parts and their functions, it deals chiefly with the characteristics of the engine as a whole. It is based for the most part on the results of research, some of which was carried out by the authors themselves or under their direction. The object of the volume is stated to be to furnish a basic understanding of the functioning of the engine, which may serve as a foundation for design or research in this field. Readers are expected to be familiar with the principles of physics, mechanics, and thermodynamics.

In the first chapter the terms capacity and efficiency as applied to the internal-combustion engine are defined, and in most of the following chapters the subject matter is dealt with from the standpoint of its bearing on capacity and efficiency. Chapter II deals with the air cycle, which is stated to be used as a first approximation in the study of internal-combustion characteristics. Allowances must be made for various deviations from the air cycle in the actual engine, and the study thus proceeds through the intermediary step of the fuel-air cycle to the actual cycle as performed in the engine. It is generally known that the efficiency of the air cycle is dependent on the ratio of the specific heats of air at constant pressure and constant volume respectively. The greater this ratio, the higher the efficiency, and the authors point out that of the various atmospheric gases, helium would give the highest efficiency, its ratio of specific heats being the largest. In this chapter the constant-pressure cycle and a cycle in which the expansion ratio exceeds the compression ratio also are examined.

In Chapter III the authors take up the subject of thermodynamics of the fuel-air mixture, which is dealt with at considerable length. Entropy and enthalpy charts are given for combustible mixtures and gases of combustion, some of these, in the form of folding plates, being bound in the book, while others are enclosed in a pocket on the inside of the back cover.

Other chapters deal with Fuel-Air Cycles, Combustion in the Spark-Ignition Engine, Detonation in the Spark-Ignition Engine, Combustion in the Compression-Ignition Engine, Direct Heat Losses, Mixture Requirements of the Spark-Ignition Engine, Fuels for the Internal-Combustion Engine, Engine Friction, Lubrication and Oils, Spark Ignition, Air Capacity of Four-Stroke Engines, Two-Stroke Engines, and Engine Performance.

A valuable feature of the book is a very extensive bibliography in which articles in the periodical press, books and pamphlets are listed under 64 headings, to which reference is made throughout the text.

Generally speaking, the volume is an advanced treatise on the theory and the performance characteristics of the internal-combustion engine, which can be recommended to those in need of information along these lines.

DIESELMASCHINEN VII, *published by VDI, verlag, Berlin NW7, Germany.*

This is the seventh special Diesel number issued by the Society of German Engineers since 1924. It contains all of the more important articles on Diesel engines that appeared in the *VDI Zeitschrift* and in the periodical *Forschung auf dem Gebiete des Ingenieurwesens* during the past two years. The articles are grouped under the following headings: Phenomena of gaseous flow, ignition and combustion, engines actually built, calculation and design, and special problems. In some cases the original articles were somewhat condensed, while in others they were revised or augmented. Many of the contributions are reports of original investigations.

Under the first heading, that of gaseous flow, there are articles on Investigations on Two-Stroke Diesel Engines and Investigation of the Scavenging Process in Two-Stroke Diesel Engines, while under the head of Ignition and Combustion there are no less than 11 different contributions. A large proportion of the contributions apply particularly to high-speed or automotive-type engines. The pamphlet (if it may be called that) contains 755 pages of the same format as AUTOMOTIVE INDUSTRIES, in relatively fine print, and 276 illustrations, hence its contents are equal to those of a medium-sized book.

FABRIC "FUEL CELL"

• Patents have been issued to the Glenn L. Martin Co. covering a fabric "fuel cell," made of thin fabric impregnated with synthetic rubber, which, under standard ground tests and in flight, is reported to have demonstrated itself to be both vibration-proof and corrosion-resistant. Other advantages claimed by the Martin Co. are: elmination of the necessity for making the surrounding structure gastight; double safeguard against corrosion by keeping gasoline, or water present in the gasoline, out of contact with metal and by complete inertness of synthetic rubber to gasoline; retarded leakage in event of puncture, the slit fabric tending to be self-inclosing, permitting continued flight; quick repairability of the fabric which, if punctured, can be removed easily, patched in 10 minutes and reinstalled, resulting in a cell which is as vibration-proof as when new, without requiring repair of holes in the surrounding structure.

GOVERNMENT CONTRACTS

• The Public Contracts Board for the week ended Dec. 10 announced Government awards of the following contracts:

For machine finished axles—The Timken-Detroit Axle Co., Detroit, Mich., $11,905; axle and brake parts—The Timken-Detroit Axle Co., Detroit, Mich., $16,385; propelling machines — General Motors Corp., Cleveland Diesel Engine Div., Cleveland, Ohio, $1,655,410; tractors—Arch Dalrymple, Jr., an individual trading as Dalrymple Equipment Co., Amory, Miss., $14,970.

PUBLICATIONS AVAILABLE

McKenna Metals Co., Latrobe, Pa., manufacturer of Kennametal **tools and blanks for steel and metal cutting,** has issued a catalog in which these products are described.*

The Underwriters' Laboratories, Inc., has issued the November, 1938, supplement to its May, 1938, list of **inspected electrical equipment.**

The Steel Improvement & Forge Co., Cleveland, has brought out a booklet entitled **"Forging Ahead with Forgings."***

"The Highway, the Motor Vehicle and the Community" is the title of an 80-page booklet issued by the National Highway Users Conference.

* Obtainable from editorial department, AUTOMOTIVE INDUSTRIES. Address Chestnut and 56th Sts., Philadelphia.

Yellow Truck & Coach

(Continued from page 803)

expand, moved to Pontiac, and during the following year production was stepped up to 200 vehicles. A two-cylinder model was added to the original single-cylinder one.

In 1908 the company was absorbed by General Motors Co., predecessor of the present General Motors Corp., which already had acquired two other producers of commercial vehicles, Reliance and Randolph. By 1910 General Motors was able to offer a line of trucks ranging from 1¼ to 5 tons in payload capacity, and by 1916 the annual production had reached a figure of 4000 units.

Upon the entry of the U. S. into the World War and the decision to standardize military trucks, the G.M.C. Model 16 became the Army's standard for the ¾-1 ton truck, and 16,000 of them were ordered.

On Aug. 17, 1925, General Motors Corp. acquired control of the common stock of Yellow Truck & Coach Manufacturing Company, part of the consideration being the General Motors Truck Corp. The former had been a manufacturer in the State of Illinois, the latter was in the State of Michigan. It was decided to centralize manufacturing activities around the General Motors Truck Corp. in Mich., and this was done. Thus Yellow Truck & Coach Manufacturing Company became the parent unit; General Motors Truck Corp., the manufacturing unit, and General Motors Corp., the sales unit. That was the form of the organization until recent years, Yellow Truck & Coach Manufacturing Company acting as a holding company. At present all manufacturing and distributing operations are concentrated in General Motors Truck & Coach Division of the Yellow Truck & Coach Manufacturing Company.

Abstracts

Reducing Cylinder Wear

To reduce cylinder wear near the upper end of the stroke, where wear is always the greatest, the Standard Motor Co. has been carrying out experiments with dry liners extending from the top of the cylinder to less than half the length of the piston when in its topmost position. It found that in a cylinder of 4-3/16-in. stroke an insert 1½ in. long fitted into the top of the bore covered the wear belt. A study of cylinder wear

showed that it is a maximum about ½ in. from the top of the ring travel and that the maximum-wear area extends down for about 1½ in. The inserts are made of a more wear-resisting material than the cylinder blocks, one or the other of two proprietary irons known as Brimol and Brivadium being used. With these inserts it is expected to get a mileage of 50,000 under normal, and 100,000 under the most favorable conditions before reboring becomes necessary. —*The Automobile Engineer.*

Japan Producing Nickel

Previous to 1937 Japan consumed annually between 3000 and 3500 tons of nickel. In 1937, on account of military requirements, the consumption reached 6000 tons, and in 1938 it is expected to attain 10,000 tons.

Until September, 1937, Japan had never produced a ton of nickel, and the opinion prevailed that production from native ores was economically impractical. However, under the spur of necessity production of nickel from nickel-bearing serpentine ores was undertaken. Deposits at Oniishi worked by the Nippon Nickel Company are said to contain 35 million tons of ore, of which about 30 million are workable. The average nickel content is only 0.33 per cent, but the ores also contain about 15 per cent of iron, 3 to 4 per cent magnesium, and 0.5 to 1 per cent chromium.

To obtain one ton of nickel, 800 tons of the serpentine ore must be worked. By-products consist of 15 tons of a special grade of cast iron and 3 tons of magnesium carbide. The actual nickel production is about 1 ton per day.

It is reported that the Japanese soda combine (Nisso Kogyo) is planning to exploit another deposit of nickel ores. In that case the ores will be treated by chlorination, that is, the ores will be roasted in the presence of chlorine, which latter is a by-product of the soda process, and this treatment will be followed by electrolysis of the fused salt.

McMullans Investigation of Gear Steels—Correction

The research work on the endurance limit of gear steels carried out by O. W. McMullan, referred to in the article on Gear Steels in the Dec. 17 issue of AUTOMOTIVE INDUSTRIES, was done for the Timken-Detroit Axle Co. and not for the International Nickel Co. as erroneously stated in the article.

TOOLS OF TOMORROW

Indications are that purchases of new machinery and production equipment during 1939 will be well ahead of 1938 as the result of improved general business conditions, according to Ford Lamb, executive secretary of the American Society of Tool Engineers.

"Most mass production industries, such as the automotive, normally place their orders for new machinery and equipment in the spring and early summer months," says Mr. Lamb. He adds, "last year indications were that some $65,000,000 would be spent for new equipment. Some of these purchase programs were subsequently suspended in view of business conditions and some of these may form a part of 1939 buying programs in addition to purchases for modernization of plants. With the upswing in business current at the present time and every indication that improvement will be continued through the next year, there is an added necessity on the part of machine tool and production equipment manufacturers to present their latest developments to potential buyers in the mass production industries."

Bar Machine

. . . National Acme Augments Line With 8-Spindle Gridley Automatic

An 8-spindle Gridley automatic bar machine has been added to the line of 4- and 6-spindle automatics manufactured by the National Acme Co., Cleveland. The manufacturer emphasizes that the RA-8 models do not supersede the RA-4 and RA-6 machines, except for production work where the availability of eight spindles, as compared with four or six, will result in further economy.

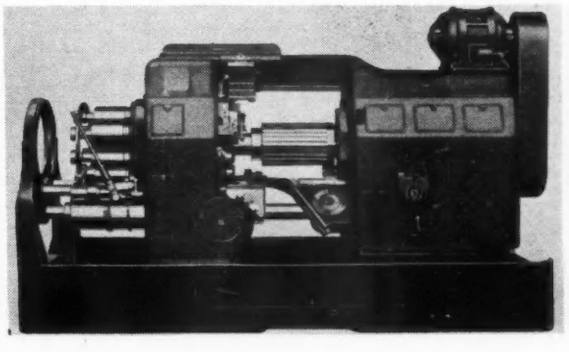
Essentially the same spindle carrier and end tool slide design employed now for some years on the 4- and 6-spindle automatics is used on the RA-8. The end tool slide is mounted around an alloy steel hardened stem which is integral with the spindle carrier. Both carrier and stem bearing surfaces are concentrically ground to fine limits at one setting.

All six side slides are exceptionally wide and long; they move on hardened steel ways having adjustable gibs. Cam and roll contacts to slides are short, resulting in a powerful, direct tool action with freedom from chatter. Each standard slide has an easily adjusted, positive stop which engages a hardened stop on the periphery of the spindle carrier, affording fine control of forming sizes.

The lower side slides are mounted on heavy bases set at an angle, supported low and well back into the frame without overhang. This design, according to the manufacturer, has four advantages: 1. the shortest possible leverage between drum, cam, and roll contact to the center of the slides; 2. heavier and wider slides and tool holders with consequent finer accuracy up to the safe limit of tool feeds; 3. more chip clearance; 4. greater operating convenience through increased accessibility to tools and work. These side slides are operated entirely independent from each other.

The two upper side slides, commonly called top slides, adjacent to the fourth and fifth spindle posi-

(Turn to page 826, please)



The eight - spindle Gridley automatic bar machine manufactured by National Acme.

Automotive Industries

Summary of Automotive Production Activity
(Week Ending Dec. 24)

BUSES Despite a slight falling off in rate of operations reported by several companies, activity appears to be grooved at the 50 per cent capacity level. A representative of a major producer brightly remarks that "the outlook for next year looks better and better."

TRUCKS "Just about the same" is the tenor of most reports on output received from factory officials. Opinion prevails that 1939 will bring a good volume of business.

TRACTORS Plans of two manufacturers to increase production early in the new year reflect optimism of most producers in this field who expect to exceed 1938 in volume of sales next year.

AUTOMOBILES It is estimated that the industry built 91,200 units this week. This is a slight drop from preceding weeks but the volume is definitely encouraging in view of the fact that the majority of producers adopted a 4-day week.

MARINE ENGINES Hopes are expressed that developments in the new year will lift this industry out of the dull period it is now experiencing.

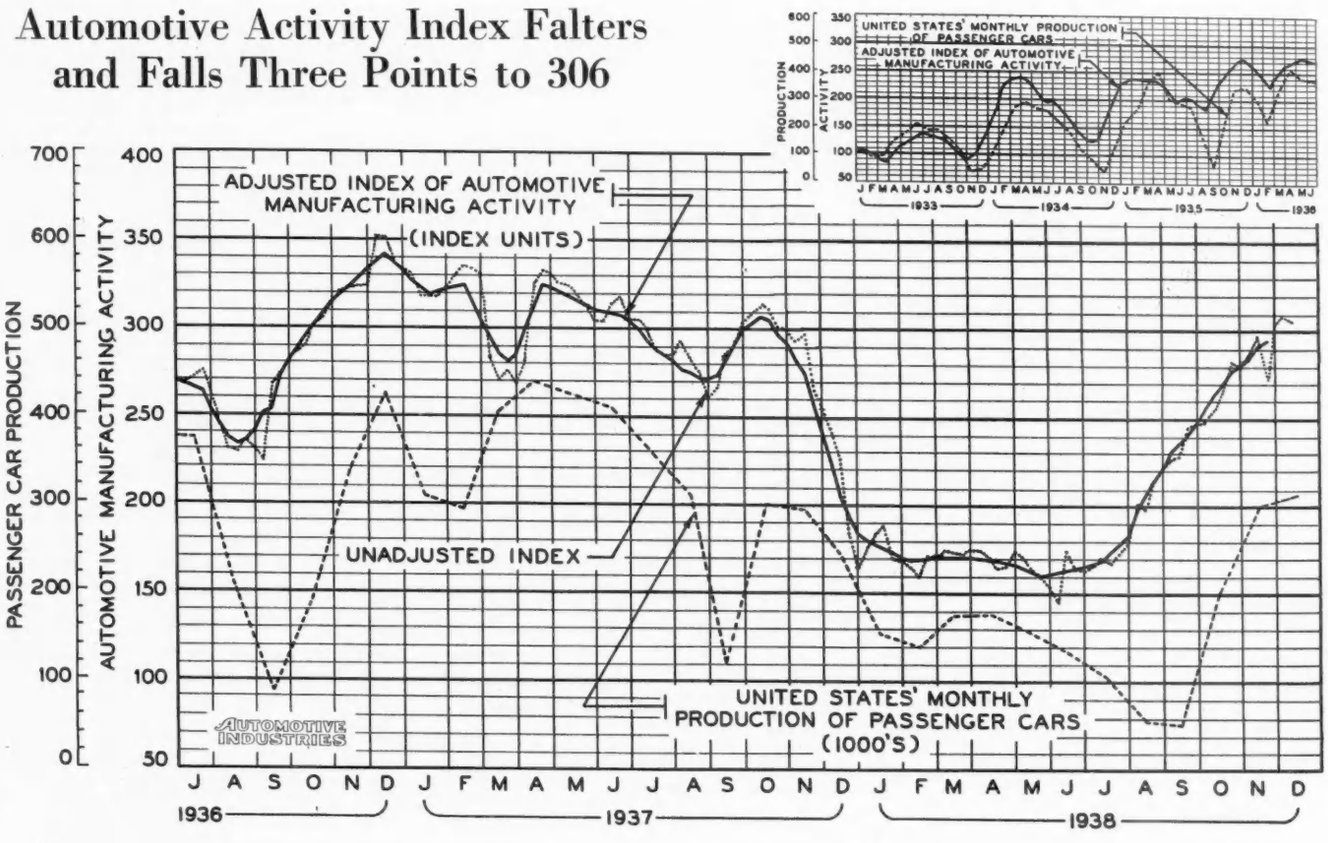
AIRCRAFT ENGINES The feverish production pace continues unabated. A report from the West Coast states that factories have orders on hand that will keep them operating for more than a year at current rate of output.

This summary is based on confidential information of current actual production rates from leading producers in each field covered. Staff members in Detroit, Chicago, New York and Philadelphia collect the basic information, in all cases from official factory sources.

World Consumption of Aluminum

According to an item in the *Journal du Four Electrique*, world consumption of aluminum during 1937 slightly exceeded 500,000 tons. Of this total, Europe consumed 314,700 tons, the U. S., 154,000 tons, and Japan, 22,000 tons. European consumption of aluminum has trebled in a decade. England, although producing considerable aluminum itself, was the largest buyer of aluminum in outside markets, having imported 32,000 tons from Canada (as compared with 20,000 tons in 1936), 6300 tons from Switzerland, and 4400 tons from Norway. The chief exporting country is Norway, which shipped 21,600 tons to numerous destinations. Of the non-European countries the U. S. imported 20,300 tons—11,700 from Canada, 4400 from Norway, and 2800 from Switzerland. The Swiss and Norwegian plants whence these imports came are controlled by the sole producer in the United States, the Aluminum Company of America.

Automotive Activity Index Falters and Falls Three Points to 306



The index of manufacturing activity faltered for the week ended Dec. 17 to slip back to the unadjusted index figure of 306, three points behind that marked up for the week preceding. However, the movement of the adjusted index curve continues upward, reaching the higher level of 295. This is four points above the figure of last week.

Passenger car production for December is estimated at 316,000, an increase of 16,000 units over the November estimate.

Just Among Ourselves

To You from Us

ALL of us who have any connection with AUTOMOTIVE INDUSTRIES wish all of you—subscribers, advertisers, and readers of any sort whatsoever—the best of Christmas wishes. Nineteen thirty-nine looks like a better year, and we hope it will be for you personally.

We know from our records who you are. Below we list most of us. Our good wishes go to you on behalf of various departments.

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International Parade of Aero

By W. F. BRADLEY

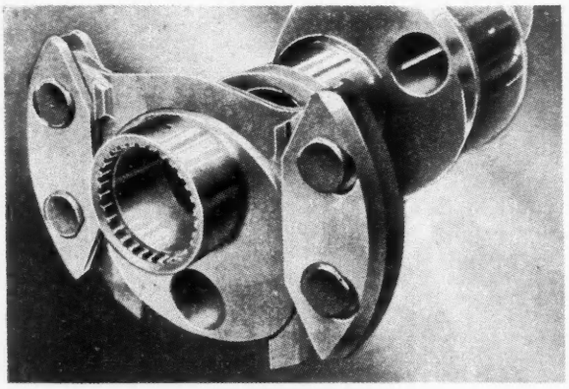
HELD at two-year intervals, the aircraft show in the Grand Palais, Paris, is the sixteenth of the series. This year's exhibition is more international than any of its predecessors, for although Italy and Russia are absent, every other manufacturing nation has its place in the hall, and for the first time the United States has a creditable representation. United Aircraft exhibits a complete sectioned Pratt & Whitney Twin Wasp, a complete Twin Wasp, the Hamilton full-feathering propeller, and the Chance-Vought airplane. This latter was shipped to Havre and flown from there to Paris, where it was demounted and re-erected in the hall. The Wright-Curtiss Company shows a cut-away Wright Cyclone in operation, and the Curtiss electric propeller. The Consolidated Aircraft Corporation shows Douglas models and a number of photographs and diagrams. There is additional interest in the Pratt & Whitney Twin Wasp in the fact that a license for its manufacture has been secured by the French Air Ministry, and the French Talbot-Darracq Company is preparing to get into production on this model. Wyman-Gordon, Thompson Products, and Lycoming also occupy booths.

Of foreign countries, Germany has the biggest display, a collective exhibit comprising the Dornier Do 17, about 17 models of other planes, 10 different types of aircraft engines, and about 20 displays of accessories, steels, light alloys, propellers, carburetors, electrical equipment, etc.

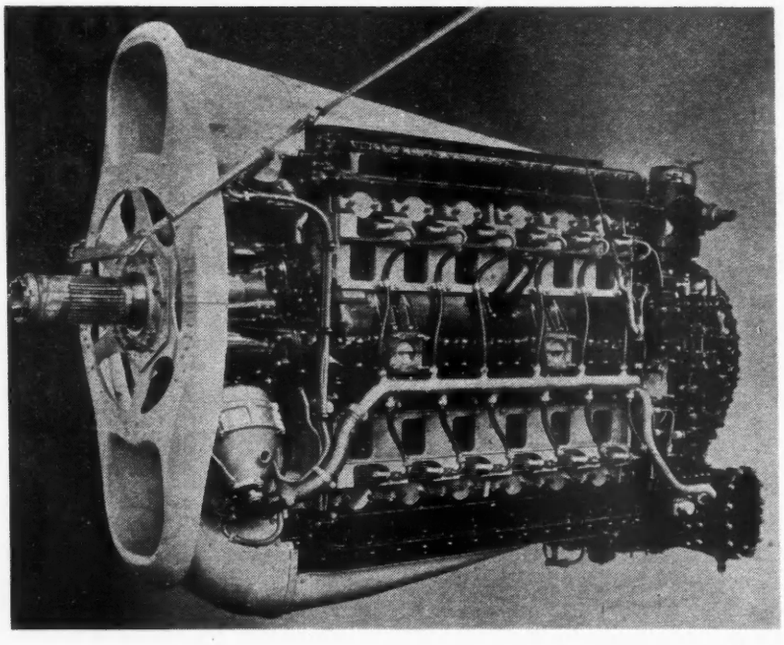
British makers show individually, but in addition to these the British Air Force has a very attractive and elaborate stand showing the eight-gun Hawker Hurricane and the Vickers Supermarine Spitfire.

Since the last show, practically the entire French aircraft industry has been nationalized, with the result that the old familiar names have nearly all disappeared, giving way to National Companies of the North, South, East, West, etc., and to a practically all-military display. There is little of a commercial character, and the small amount that is to be seen more often consists of dummies and small-size models than of planes actually in production.

The move towards air-cooled engines, which was marked a couple of years ago, has grown in intensity, until the show is really one of direct-



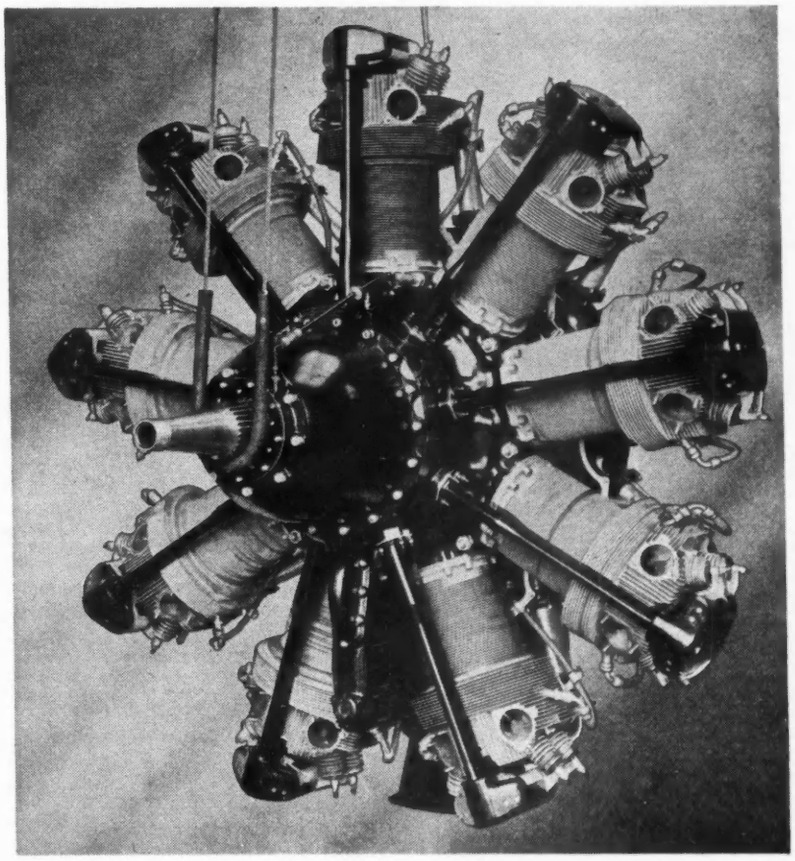
Sarazin dynamic torsional vibration damper



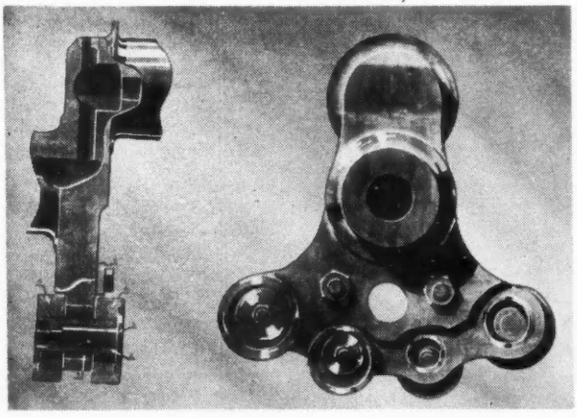
Napier-Halford 24-cylinder Dagger 1000-hp. engine

Engines

in the biennial aircraft show at the Grand Palais, Paris, includesmodels from every producing nation except Italy and Russia



Bristol Pegasus poppet-valve radial air-cooled engine



Redynam dynamic vibration damper

cooled engines. However, there are a few notable exceptions to this rule: the Rolls-Royce Merlin models; a new H-type 24-cylinder Hispano-Suiza; an inverted 12-cylinder liquid-cooled Mercedes-Benz, and some high-powered models built by the Société Nationale, formerly the privately-owned Lorraine Company.

Renault has discarded all his liquid-cooled engines and is showing six models of air-cooled engines, these being a 14-cylinder radial direct drive of 6.07 by 6.93 in., the same model with a reducing gear; a 12-cylinder inverted of 4.73 by 5.51 in.; two four-cylinder in-line inverted engines, and a six-cylinder inverted. All the big units have a compression ratio of 6.4. It is understood that new models are in preparation.

Two years ago Potez produced a 12-cylinder flat engine of 500 hp. at ground level, designed for mounting in a wing and laid out with a view to ease of service overhaul. This has been supplemented by a 90 deg. V-inverted 8, using the same cylinders and valve gear, the cylinder dimensions being 4.92 by 4.73 in. Various small units for driving accessories on the big flying boats are produced. The latest of these is an in-line four of 61 cu. in., developing 20 hp. at 4500 r.p.m. and weighing, complete, only 108 lb. It has a turbine on each end of the shaft, one aspiring air, the other expelling hot air. The nitrided crankshaft is carried in five bearings, and the connecting rods are in one piece, with roller bearing. By reason of the short stroke, the rods can be passed over the webs of the crankshaft, and the rollers inserted afterwards. This unit can be run in a sound-proof cabin. The Potez aircraft factory is now a Government institution, but the engine department is separate and privately owned.

The Hispano-Suiza H-type engine is built up of the same cylinder elements as the Y-models (bore and stroke 5.12 by 6.69 in.) and follows the same general layout. Two blowers at the rear, each one feeding an upper and a lower bank; three carburetors on the outside of each bank of cylinders—12 in all—and a spur-type reducing gear with provision for firing through the propeller shaft. This engine, which probably will not be in the air for

three months, will give 2600 hp. at ground level. Changes in the Hispano-Suiza liquid-cooled models include the adoption of forked rods and of the Sarazin vibration damper, this latter being used on both the liquid-cooled and the radial types. The basic principle of this damper is the use of pendulum weights freely suspended in the field of centrifugal force, the pendulums having a frequency of oscillation proportional to the speed of the shaft by which they are driven.

The only other H-type engines in the show are the air-cooled Napiers. The smaller of these, the 16-cylinder Rapier, was at the last Paris show. The Dagger is a 24-cylinder job of 3.82 by 3.74 in. bore and stroke, piston displacement 1027 cu. in. and a compression ratio of 7.5. The Dagger gives 1000 hp. at 8750 ft., at 4200 r.p.m. and its dry weight is 1388 lb. It has a double-entry supercharger and provision for a constant-speed propeller. By a rearrangement of the accessories, the overall length has been reduced by 11 inches.

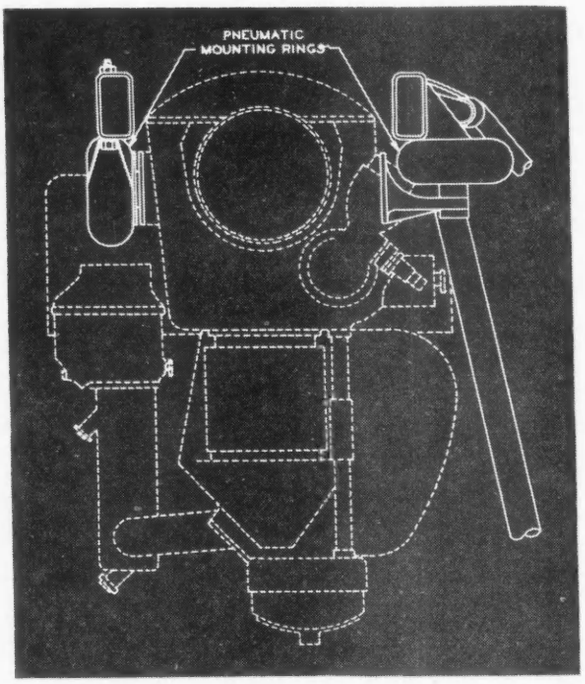
Outstanding among the German exhibits is the Mercedes-Benz DB 600, an inverted 12-cylinder V liquid-cooled engine of 5.91 by 6.30 in. bore and stroke, 2065 cu. in. displacement, and a compression ratio of 6.8. Contrary to previous Mercedes practice, the crankcase is a one-piece silumin casting, braced by five transverse partitions, as well as interior longitudinal and transverse ribs and closed on top by a cover plate Each bank of six cylinders is a light-alloy casting with pressed-in liners. The method of mounting the cylinders on the crankcase is by threading the base of the barrels and securing them by a ring nut on the interior. The two valves in the head are operated by overhead camshafts. With a view to reducing the frontal area, the blower is mounted on one side of the engine and driven through bevel gearing and a cross shaft. The supercharger blows on the carburetors, mounted in the angle of the cylinder banks, thus avoiding the possibility of ice formation. There is an automatic pressure limiting device between the blower and the carburetor, and a timing mechanism which limits the use of full blower pressure with a rich mixture, when taking off, to one minute.

The crankshaft runs in copper-lead bearings; the main connecting rod is on roller bearings, and the articulated rod has a copper-lead bushing. The take-off power is 1050 hp. at 2400 r.p.m. The cruising power is 800 hp. at 1300 ft. at 2300 r.p.m. For competitive events the power of this engine has been boosted to 1800 at 3500 r.p.m. The dry weight is 1200 lb. for the ground-charged and 1245 lb. for the altitude-charged model. This engine was used on the recent Berlin-Tokio flight.

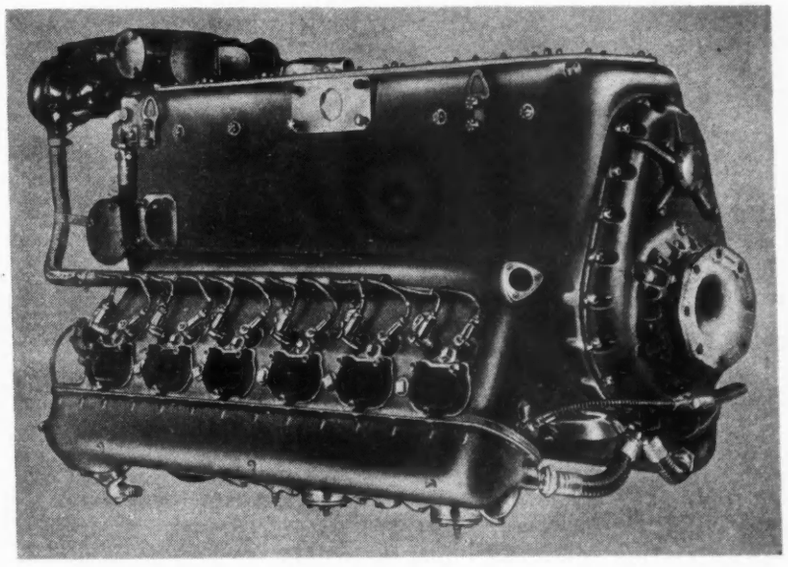
Biggest of the power units in the show is the Mercedes-Benz 16-cylinder Diesel for Zeppelin service. With a bore and stroke of 6.90 by 9.06 in. and a compression ratio of 16, the power output is 1300 hp. and the dry weight, 4400 lb. The engine is of the precombustion-chamber type, with steel cylinders carrying four valves operated by pushrods from camshafts in the crankcase. The engines are reversible by displacement of the camshafts under compressed air. The crankcase is of heat-treated silumin-gamma, with cooling fins on the lower part. Dry-sump lubrication is used, with eight plunger pumps for the main bearings. Four Bosch fuel-injection pumps, each supplying four cylinders, are mounted on the rear end of the engine.

Junkers, in addition to the Jumo 205 Diesel, shows the new Jumo 211 12-cylinder inverted liquid-cooled gasoline engine of 1200 hp. Other units on the German stand are a B.M.W. nine-cylinder radial of 880 hp., a 1000 hp. nine-cylinder radial Bramo-Fafnir, an Argus 12-cylinder inverted air-cooled model, and a Hirth of the same type, with 1.5 reduction gear.

Bristol is making a special display of the single-sleeve-valve models and of the Pegasus poppet-valve model which recently carried the world's non-stop record to 7162 miles. Arrangements have been made for the production in France of the Bristol sleeve-valve Hercules by the Alsthom Company, and one of these models is shown on that company's stand. The factory will be located at Lyons, but production has not yet begun. A new model of the sleeve-valve type is the Taurus 14-cylinder which has just completed its first series of flight tests. By reason of the valve design, the overall diameter is reduced to 46¼ in.; while no definite figure is given for the power output, it is said to be in excess of 1000 hp. at medium or high altitude, according to supercharger ratio. The engine has the relatively high crankshaft speed of 2800 to 3300 r.p.m. The bigger Hercules, of the same general type, is now in regular production, its international rating being 1100 to 1150 hp. at 2400 r.p.m., at 5000 ft. The model at the show is presented in the form of a complete installa-



Renaux pneumatic engine mounting



Mercedes-Benz inverted 12-cylinder V liquid-cooled engine

tion, including forward exhaust manifold, new type close-fitting cowl with controllable shutters, flexible engine mounting, oil cooler system, warm- and cold-air intake to the carburetor. On the bulkhead behind the engine there is an accessory gearbox, with the various aircraft accessories, with connection from the engine by a flexible drive shaft.

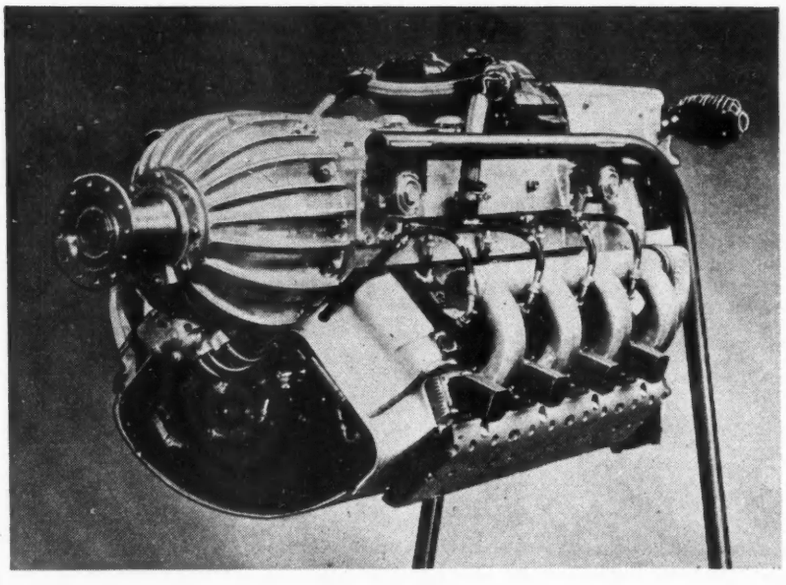
De Haviland features the new Gipsy inverted air-cooled 12 used on the Imperial Airways Albatross Atlantic liners. Cooling air enters through openings in the leading edge of the wings and is passed through fixed ducts to scoops or galleries, one on the outside of each bank of cylinders. The scoops are designed to be removable for access to the plugs, and the joint is made airtight to prevent putting air under pressure into the engine bay. After passing between the cooling fins (see page 825) the air escapes at the base through adjustable shutters. The Gipsy Twelve has a bore and stroke of 4.64 by 5.51 in., its displacement being 1121 cu. in. and its compression ratio, 6. Its maximum take-off power is 505/525 hp. at 2600 r.p.m., at sea level.

Direct injection of gasoline is employed on a nine-cylinder radial produced by the Société Nationale de Construction de Moteurs. This was formerly the Lorraine-Dietrich Company and became a government organization under the law of 1936. As the engine is a modification of an existing type, the injection takes place in the intake manifold, from a Bronzavia pump, with governor, mounted vertically at the rear of the engine and heated by oil circulation. It is understood, however, that experiments are being carried out with direct injection into the cylinders.

One of the liquid-cooled models, the 12-cylinder V Sterna, of 5.83 by 5.83 in. bore and stroke, has an outboard propeller 60 in. from the nose of the engine. The extended propeller shaft is carried in a tubular housing connected to a planetary reducing gear driving two propellers in opposite directions. This has been developed specially for the Koolhoven F.K. 55, on which the engine is mounted in the fuselage, immediately under the wings, for balancing purposes. The Société Nationale is now operating an Alpine laboratory and test station on Mont Lechat, 6900 ft. above sea level. When the approach problem has been solved, the station will be carried to a point 12,500 ft. above sea level. Two open-air test benches are in use, one for air-, the other for water-cooled engines. Problems which are given special attention are ice formation, starting from cold, injection, compression ratios, and ignition advance in relation to altitude.

Apart from the German Junkers, the only heavy oil engines shown are the Clerget and the Coatalen. The latter, shown by its designer, Louis Coatalen, is a 12-cylinder liquid-cooled V, of 5.91 by 6.69 in. bore and stroke, giving 600 h.p. at 2200 r.p.m. and weighing 1180 lb. It has constant-pressure injection, with variable admission, the injection pressure being 10,000 lb. per sq. in. The Clerget is on the French Air Ministry stand, one model being a 14-cylinder air-cooled engine, the other a 16-cylinder V water-cooled transatlantic model of 1500 to 2000 h.p. It has four valves per cylinder, with pushrod operation, and pumps on the outside of each cylinder bank for each group of two, with two points of injection in the head.

(Turn to page 825, please)



Potez inverted V-8 engine

Torque, Speed and Fuel Consumption

The relationship of these factors in the operation of aircraft engines is shown in a series of N.A.C.A. tests

THE fuel consumption of an aircraft engine is an important consideration, especially if the engine is used in long-range aircraft. Even the most efficient engines will consume their weight in fuel in 3 to 5 hours of flying, depending on what percentage of the total power is being used.

An investigation has been completed at the N.A.C.A. laboratory at Langley Field, Va., to determine the effect of engine torque and speed on the fuel consumption, and a report on this investigation is contained in N.A.C.A. Technical Note No. 654 by Oscar W. Schey and J. Denny Clark.

Two single-cylinder, air-cooled engines were used in these tests, one being a cylinder from a Pratt & Whitney 1340-H Wasp engine, which is rated 550 hp. at 2200 r.p.m. at 8000 ft. altitude; the other a cylinder from a Wright 1820-G Cyclone engine, which is rated 800 hp. at 2100 r.p.m. at sea level.

The cylinders were equipped with standard pistons. The compression ratio, the length of stroke and the valve timing of each of the two test engines compared with the standard engines are given in the accompanying table.

The carburetor-air system consisted of an independently driven supercharger, an air cooler, regulating valves, and a surge tank. A 4-in. N.A.C.A. Roots-type supercharger supplied air at pressures higher than atmospheric. A large water-cooled aftercooler was used to maintain the carburetor-air temperature at approximately 85 deg. Fahr. The valves of the supercharger and the surge tank served as throttling valves when the engine was operating with less than atmospheric pressure in the manifold and as an auxiliary control when the desired boost pressure could not be obtained by the supercharger speed control. The surge tank served to damp out the pressure pulsations from the supercharger and the engine, and also as a depression tank when the manifold pressure was reduced to less than atmospheric.

The curves in Fig. 1 show the relation between the brake specific fuel consumption and the b.m.e.p. for a large range of manifold pressures and two engine speeds for the 1340-H cylinder. The curves in Fig. 2 show the same data on an indicated basis. The fuel consumption and the b.m.e.p's. for the runs in which the supercharger was used were corrected for the power required to supply air at pressures higher than atmospheric. Curves for air-fuel ratios of 11, 12, 13, and 15 are also shown in Figs. 1 and 2. Plots similar to those in Figs. 1 and 2 are given

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ENGINE CHARACTERISTICS

Cylinder	Compression ratio	Stroke (in.)	Valve timing (0.010-in. cold clearance) Intake Open (deg. B.T.C.)	Intake Close (deg. A.B.C.)	Exhaust Open (deg. B.B.C.)	Exhaust Close (deg. A.T.C.)
Pratt & Whitney 1340-H:						
Standard	6.0	5¾	60	125	90	56
Test	5.6	6	23	69	80	10
Wright 1820-G:						
Standard	6.4	6⅞	47	70	104	56
Test	7.4	7	13	54	70	39

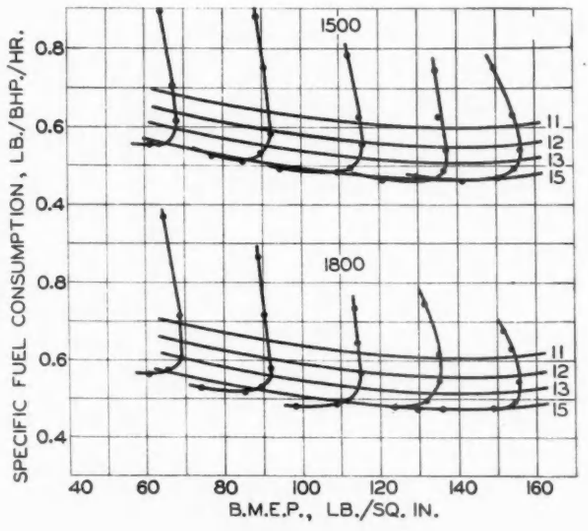


Fig. 1—Effect of b.m.e.p. on specific fuel consumption at several throttle openings and two engine speeds

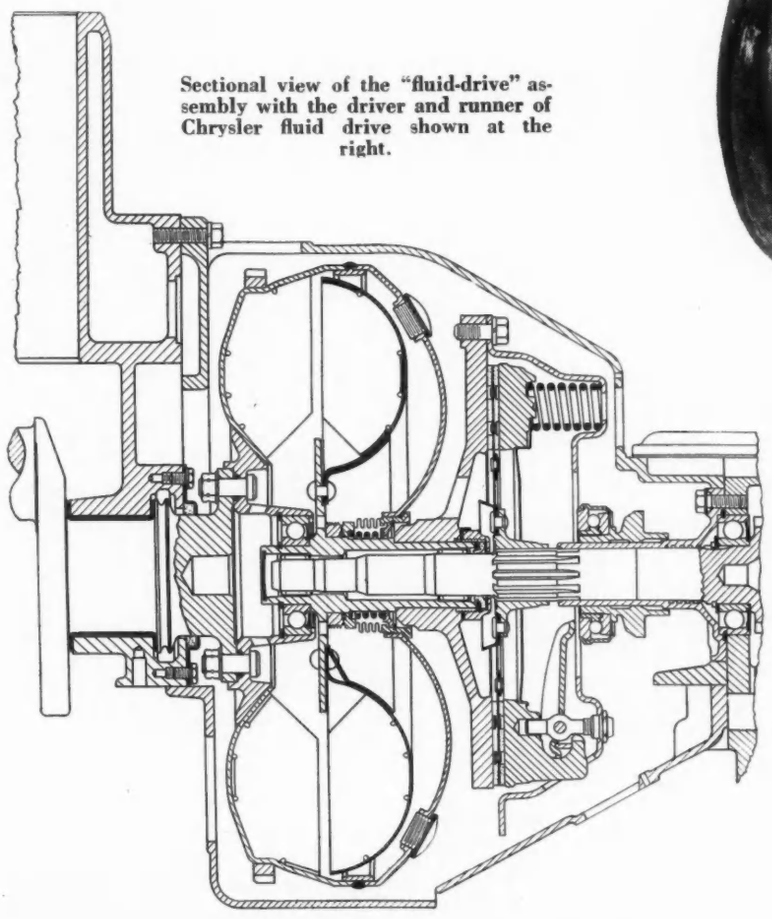
Chrysler is First American Car to adopt the "Fluid Drive"

CHRYSLER'S adoption of the "fluid flywheel," or "fluid drive," as standard equipment on the Custom Imperial marks the first appearance of this device on American-built cars. It is claimed to give a gasoline automobile the same flexibility that characterized the steam and electric vehicles, without the disadvantages that caused these media to be abandoned long ago for personal transportation.

The two revolving elements of the fluid drive are known as the driver and the runner. Power is transmitted from the driver to the runner through the medium of oil in motion; there is no mechanical connection between the driver and the runner, and consequently none between the engine and the rear wheels.

When the car is being driven by the engine the driver always turns faster than the runner. The difference between the rotary speeds of the two members, called the slip, is said to amount to only about 1 per cent in ordinary driving at normal speeds over a level road. When the pulling is hard the slip is greater, and it amounts to 100 per cent when the car is left in gear while the engine is running and the car is stopped. The advantages claimed for the fluid drive may be summarized as follows:

The car may be placed in high gear and normal traffic followed without declutching or shifting gears. The kickdown overdrive in conjunction with fluid drive gives virtually an automatic two-speed transmission in high gear. Declutching is unnecessary when stopping, as the engine will not stall. The clutch pedal is not sensitive, as in a standard car. Thus unskilled drivers have no difficulty in making smooth starts. The fluid drive damps all torsional vibrations originating in the engine, and reduces shock and wear and tear on the whole driving train from the engine to the rear wheels. In addition the ride is



Sectional view of the "fluid-drive" assembly with the driver and runner of Chrysler fluid drive shown at the right.

smoother and shocks are greatly decreased when suddenly speeding up or slowing down. Wear and tear on all parts of the driving mechanism are reduced, and considerable savings in maintenance and depreciation costs result. Slow-speed operation is greatly improved. The car may be driven as slowly as desired in high gear without declutching, and there will be no engine thrashing or buckling.

On slippery roads it is much easier to avoid skidding with a car equipped with a fluid drive than with a standard car. With the engine running, the fluid drive gives a no-back feature on a hill, as the car may be allowed to remain in gear and the throttle opened just enough to prevent the car from rolling backward. The absence of gear shifting or clutch-pedal operation in normal traffic leaves the driver free to devote all his attention to the road. When starting the engine, it is unnecessary to shift out of gear or declutch. This is particularly advantageous on a hill. The fact that the engine will not stall contributes to safety of operation in heavy traffic, on hills, and in crossing railroads.

The engine may be used as a brake just as in a standard car, and the fluid drive is equally efficient on drive and coast. The engine may be started by pushing the car in gear just as in a standard car. There is nothing new to learn in driving a car equipped with a fluid drive.

The fluid drive is made entirely of stamped, pressed, and forged steel parts. The forgings used in the unit consist of the hubs for the impeller housing and the runner. The large outer housing and the runner disk are made of pressed cold-rolled steel. The vanes, 22 in the impeller and 24 in the runner, are made of stamped, cold-rolled steel. They are permanently assembled into the impeller and runner disks by three spot welds on each vane.

The runner disk is permanently riveted to the runner hub. The runner is mounted in the impeller on a ball bearing, located in the forward part of the assembly. The runner is supported in assembly by the transmission drive pinion shaft.

The oil used in the fluid coupling is a low viscosity mineral oil. It provides the lubrication required by the bearing enclosed with the coupling, and it will pour at the lowest anticipated temperature. Moreover, mineral oil has no corrosive effect on any of the steel parts comprising the unit.

Torque, Speed and Fuel Consumption

(Continued from page 818)

in the report for engine speeds of 1200 to 2400 r.p.m.

The results from these tests of a single-cylinder engine showed that:

1. In order to obtain minimum specific brake fuel consumption, an engine should be operated at high torque and at speeds from 60 to 70 per cent of the rated speed. Operating at 45 per cent of maximum torque increased the fuel consumption 20 per cent over the fuel consumed at maximum torque when the engine was operating at 70 per cent of rated speed.

2. The indicated m.e.p. and the engine speed had only a small effect on the minimum indicated fuel consumption within the practical range of operation.

3. An engine having a compression ratio of 5.6 can burn as lean a mixture as an engine having a compression ratio of 7.4.

4. Practically no improvement in fuel consumption was obtained by operating with mixtures leaner than an air-fuel ratio of 15.5.

The minimum indicated fuel consumption in all tests on the 1340-H cylinder was about 0.4 lb. per indicated bp.-hr., except at 1200 r.p.m. Therefore, the minimum fuel consumption on a brake basis may be obtained for a wide range of operating conditions from the mechanical efficiency and the minimum indicated fuel consumption for one condition as follows: Establish a curve of indicated fuel consumption against mixture ratio for a constant engine speed and a given manifold pressure. Determine the friction and the b.m.e.p. over the desired range of engine speeds and manifold pressures for use in determining the mechanical efficiency. Divide the minimum indicated fuel consumption by the mechanical efficiency for a particular condition to obtain the minimum brake fuel consumption for the specified condition. This method makes it unnecessary to establish a mixture curve for each condition.

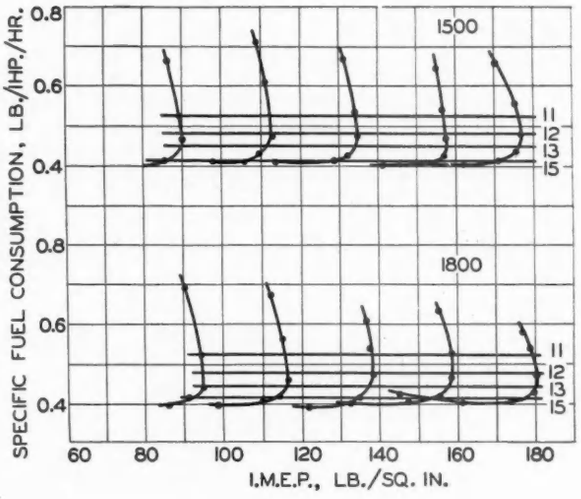


Fig. 2—Effect of i.m.e.p. on specific fuel consumption at several throttle openings and two engine speeds

For a constant engine speed and manifold pressure, the fuel consumption with the maximum-power mixture is from 10 to 15 per cent higher than that obtained with the maximum-economy mixture. Likewise, the mechanical efficiency, based on conditions with the maximum-power mixture, is from ½ to 1½ per cent higher than the mechanical efficiency based on conditions with the maximum-economy mixture. The larger difference in mechanical efficiency is obtained at low torque values.

Anti-Knock and Mixture-Distribution Problem in Multi-Cylinder Engines

A SUGGESTION as to how the compression ratio of automotive engines can be still further increased without incurring trouble from fuel knock is contained in a paper read at the annual meeting of the American Petroleum Institute in Chicago by A. J. Blackwood, O. G. Lewis, and C. B. Kass of the Standard Oil Development Co., Elizabeth, N. J.

It has been observed that there are considerable differences in the knocking tendencies of different cylinders of multiple engines. These differences are due in part to unequal distribution of charge to the various cylinders and to differences in the spark timings of individual cylinders resulting from inaccuracies of the interrupter cam.

To find out why cars in apparently identical condition should differ so widely in their anti-knock requirements, the authors made tests on an eight-cylinder, in-line, overhead-valve engine. Samples of exhaust gas were taken from individual cylinders at a point ½ in. from the valve, and also from the main exhaust line from the engine. Analyses of the exhaust gases were made by means of the Orsat apparatus and also by means of gas analyzers of the thermal-conductivity type, and from the results of these analyses the composition of the mixture received by the engine was determined. It was found that the best way to express the non-uniformity of distribution for any given conditions of operation was by the difference between the mixture ratios of the leanest and richest charges. The results for a particular grade of fuel are given in Table I.

TABLE I

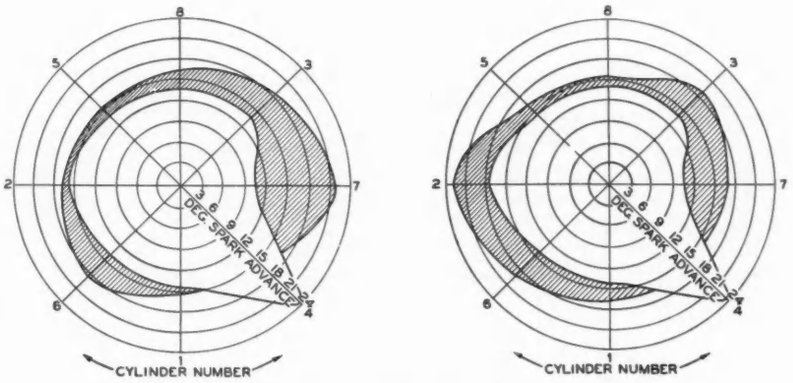
Distribution Characteristics (Using Regular-Grade Gasoline)

Spread, in Air-Fuel Ratios, Between Maximum and Minimum Air-Fuel Ratio in the Individual Cylinders

	Miles Per Hour				
	10	15	20	30	40
Road load	...	3.5	3.0	1.5	2.6
2-per cent grade	2.5	...	...	...	1.6
4-per cent grade	4.1	3.3	2.8	1.0	0.8
6-per cent grade	4.1	2.6	1.1	1.1	0.9
8-per cent grade	3.9	3.1	2.2	1.2	0.7
10-per cent grade	2.0	1.4	0.8	0.3	2.7
Full load	3.0	6.6	6.9	5.9	5.6

Tests were made with a series of fuels of different volatility ranging from a regular grade gasoline up to butane, to determine the effects of volatility on the distribution characteristics. The distribution spread (difference in mixture ratio between the richest and leanest charge) was 7.1 for regular-grade gasoline, 4.7 for aviation gasoline, and 0.9 for butane. These tests showed that the distribution can be improved by increasing the volatility of the fuel, but also that it would be necessary to go to aviation-grade gasoline to effect any marked improvement. A further study of the results indicated that the 90-per cent point of the fuel is a fairly reliable index of the degree of perfection of the distribution, provided no fuels of unusual latent heats are included.

To determine the effects of manifold design on mixture distribution as well as on maximum power and economy, series of runs were made on the same eight-cylinder engine first with its manifold heated, then with this same manifold unheated, and finally with a special manifold unheated, and the results shown in Table II were obtained. In the special manifold the four branches extended at right angles from the straight trunk and the trunk extended some distance beyond the outer branches. While it is realized by the authors that warming up and general flexibility would not be satisfactory entirely without heat, they feel that the results are of interest as indicating what beneficial results might be obtained by working along these lines. The decrease in spread from 7.1 to 3.1 is an improvement of 56 per cent, or almost twice as great as the improvement in distribution which would be



Polar diagrams of spark advance for individual cylinder. The best cam position is shown at the right with the worst at the left. The shaded areas show the spark advance actually obtained in each cylinder with a maximum difference of 11.5 deg. on the worst and 6.5 in best cam position.

achieved by changing from regular-grade to aviation gasoline.

It is generally believed that when an ignition timer is adjusted in accordance with factory recommendations, all of the cylinders are equally timed. Checks made by the authors on the eight-cylinder engine showed, however, that when cylinder No. 1 was set to fire at a given point, other cylinders were firing as much as 6 or 8 deg. from this point. This, of course, is due to differences in the contours of interrupter cams. Checks made on eight different used ignition units and four new ones showed that there were irregularities in all of them and that those in the used ignition units were not greater than those in the new ones. It was noted also that with ignition units in which the centrifugal and vacuum advance is mounted inside the unit, the spark-advance variation is changed considerably when the breaker plate is rotated in the housing. This is due to the fact that the breaker plate does not rotate absolutely concentrically to the cam, thereby increasing or decreasing the leverage on the breaker arm.

In timing the spark at the factory it is the common practice to set Cylinder No. 1 to fire at a given point, and it may then happen in extreme cases that all other cylinders will fire either earlier or later. The authors surmise that a great number of complaints of detonation on factory-recommended spark setting can be traced to variations in the spark advances of individual cylinders.

In a recent survey of four of the lower-priced cars, a variation in octane requirement of cars of the same make and model was found to be 23 octane numbers for one make, and 17, 10, and 4 octane numbers for the others. Part of this great variation was due to variations in the cam angles of the ignition breakers. On the engine used in this investigation, a 2-deg. reduction in the spark advance permits of a reduction in the octane number of the fuel of about 3. If the octane requirement of this engine were taken with an ignition unit of 6 deg. variation in spark angle, and then with one or zero deg. variation, the reduction in the octane requirement might be as much as 9 octane numbers.

It would appear therefore that by adopting two simple measures, car manufacturers could reduce the average octane-number requirement of their cars an appreciable amount without any sacrifice in power or economy. These two measures consist in reducing the maximum tolerance on the firing angle of the breaker cam and adopting an assembly step in ignition timing to insure that No. 1 cylinder is fired by that cam lobe which gives the greatest spark advance. It is of interest in this connection that one manufacturer recently decreased the tolerance on the firing angle from 3 to 2 deg. on the distributor shaft, or from 6 to 4 deg. on the crankshaft. This latter figure, however, is still excessive.

To obtain information on the knocking tendencies of individual cylinders, an arrangement was worked out in which a second ignition distributor is operated in parallel with the standard distributor. By this means the spark advance for one or more cylinders can be increased or decreased without affecting the remainder. The most satisfactory method of determining which cylinders are detonating consists in retarding all cylinders until there is no possibility of any cylinder detonating, i. e., by retarding the spark below the point of audible detonation. Then by advancing the spark on each cylinder separately, it may be determined readily just what cylinders are detonating on the normal spark setting and with what intensity, and what spark advance is necessary to make each cylinder start detonating. The effect of manifold mixture temperature upon the individual-cylinder knocking characteristics also is determined readily by this spark-advance method.

A typical example of results obtained by this method is given in Table III. The spark advance is that for incipient detonation in each cylinder.

To determine the octane-number requirement of each cylinder, the eight-cylinder engine was operated with mixtures of the primary reference fuels C-10 and A-4, under maximum knocking conditions, viz., 20 m.p.h. (1000 r.p.m.), full-load, with the carburetor adjusted for a mixture ratio of 12.5:1 as determined from an over-all exhaust analysis. Under these conditions the spark advance giving incipient knock in each cylinder was determined for different mixtures of C-10 and A-4. From these tests the following conclusions were drawn: The actual spark advance to produce equal knock intensity in the individual cylinders varies by 15 deg. If all cylinders were synchronized to have the same spark advance, say 16 deg., the octane-number requirements of the fuel in the various cylinders would still vary by as much as 16 points.

It is interesting to estimate the maximum possible difference in the octane-number requirements of the individual cylinders of the test engine when conditions are such that the cylinder receiving the worst knocking mixture simultaneously receives the greatest spark advance. Of interest also is the corresponding minimum possible difference in requirement of the individual cylinders when the engine is assembled in such fashion that the cylinders receiving mixtures tending to knock get compensation by receiving the lower spark advances. In order to make this estimate, it is helpful to sketch two polar diagrams superimposed one upon the other, as shown in Fig. 1. The chart is drawn for conditions obtaining on the standard test engine adjusted in accordance with manufacturer's recommended carburetor and spark

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TABLE II

Change in Power, Economy, and Distribution with Change of Intake Manifold—Regular-Grade Gasoline

	Standard Heated Manifold	Standard Unheated Manifold	Special Unheated Manifold
Full-load horsepower (at 1,000 r.p.m.) increase over standard, per cent	..	4.0	11.05
Full-load specific economy (at 1,000 r.p.m.) improvement over standard, per cent	..	4.48	7.70
Maximum variation in air-fuel ratio between richest and leanest cylinders (at 1,000 r.p.m.) full-load, per cent	7.1	5.80	3.10

TABLE III

Fuel No.	1	3	3	4a
Mixture Condition	Warm	Warm	Warm	Cold
Compos. Air-Fuel Ratio	12.5:1	12.5:1	13.5:1	12.5:1
Cylinder No.	Degree Spark Advance before Top Dead Center to Cause Incipient Detonation			
1	16.0	21.5	17.0	15.0*
2	19.5	25.0	31.5	19.0
3	20.5	27.0	32.5	19.0
4	29.5	20.5	33.5	27.0
5	16.5	23.5	25.5	17.5
6	15.0*	20.5	15.0*	16.5
7	14.0*	16.0	15.0*	13.5*
8	14.0*	17.0	14.0*	18.0

* Cylinders knocking on normal spark advance.

Fertig Adds Data to Earlier Article

By Arthur Fertig

THERE is so much need for light upon the instalment selling phase of the automobile industry, one could wish that Milan V. Ayres had seen fit to contribute more substantially from his experience, in his article which appeared in the Oct. 8 issue of Automotive Industries.

Mr. Ayres takes exception to six points in my article "Sales Weakened by Too Many Hypodermics?", which was published in Automotive Industries of July 9. He considers these points in error and concludes, therefore, that the entire thesis topples. Yet the thesis is far from damaged and the industry remains maladjusted. However, his criticisms afford an opportunity to clarify and to amplify much that was compressed to hold my article within a designated limit.

The statement that 20 per cent was too high a proportion of the national income to be spent for individual transportation, draws the first fire. Mr. Ayres declares the figure to be nearer 10 per cent, and cites the Government Census of Retail Distribution as proof. If, however, a true picture of costs is sought, to these retail figures must be added insurances, all the many taxes incident to automobile ownership and maintenance, and indirect taxes for servicing debts created by highway construction and maintenance. A portion of the highway cost can be charged legitimately to the greatly increased use of passenger cars, quite apart from commercial use. The fact that part of the debt is being saddled on the future, doesn't alter the point. If these costs are computed fairly they will be found to lift the total far above 10 per cent. But in direct reply to the question, "Would he (Mr. Fertig) also say that 10 per cent is too great?", my answer is, "Yes, if it leads to the situation described in my article. Even 5 per cent is excessive if it leads to such disastrous results."

The foregoing percentage is not essential to the main theme, nor is it very important to determine the exact number of finance houses in existence. There have been a large number for many years, as Mr. Ayres says, but the important sources of credit were the large ones. In recent years all the finance companies have been doing a larger volume of business and *credit outlets* are more plentiful because banks and personal loan agencies have become important factors in credit distribution. I stress the words *credit outlet,* because misunderstanding arises from confusing the term with finance houses.

Credit Outlets—Finance Houses

Mr. Ayres asks for more light on my statement that "all these agencies (credit outlets) are in competition to put their funds to work, and so apply additional pressure upon the consumer". He believes it to be inaccurate and counters that "they simply compete among themselves for a share of the financing business which is created through the instalment selling by merchants." Both our statements are correct. If "persuasion" were used in place of "pressure", the meaning would be clearer. In competing among themselves for a share of the financing business, the credit outlets compete with rates, thus the retailer is persuaded to use more of these funds, and he in turn, persuades the consumer. The attractiveness of rates, therefore, has been responsible for an increase in the volume of instalment selling.

It is true, as Mr. Ayres says, that "the making available of large amounts of credit is not necessarily accompanied or followed by the use of that credit". This applies only to capital goods. The financial history of the recent depression years has amply proved that available consumer credit has been used abundantly.

The fifth point raised by Mr. Ayres is a very important one. He denies that there has been an "increase in the variety and volume of goods sold on the instalment plan". He says:

"The fact is the practice of instalment selling has not been extended in recent years to cover any new class of goods whatever, except newly developed goods like radios and stokers, which were not available before on any terms. Furthermore there is practically no evidence that the percentage sold on instalments of any type of goods has materially increased in the past ten years, except for jewelry and "soft goods". The increases in these two items have been too trivial in volume to be of the slightest importance in the economic picture".

It doesn't matter whether the items are new or old. If they are sold now and were not formerly, the variety has been increased. Here are a few, first sold widely on instalments within the past ten years:

Ladies genuine fur coats, electrical fixtures, plumbing fixtures, oil burners, wall paper, paint, tourist travel, and funerals.

If one denies all evidence save that of published data, then there is practically no evidence of a *percentage* increase in volume. It was one of the cardinal points of my article that there is a great amount of instalment selling which is not so recorded. How is it possible to believe there has been no increase when the largest cash department store in the country finances hundreds of thousands of dollars worth of merchandise through a personal loan organization, yet purports to do a cash business? How can one subscribe to the fixed percentage idea when another large department store evades the instalment selling appellation by using "revolving credit" to finance customers? Can one still hold that there has been no increase when the two largest mail order houses in the country carry on a substantial volume of credit business in their retail stores? Our figures show that the percentage of instalment business (exclusive of automobiles) has risen from approximately 10 per cent

to 18 per cent in the past ten years.

A very charitable case for instalment selling can be made by relying solely upon published statistics. Such cases are made and are of small value. It would be possible to write an article replete with statistics and thus save the author the exhausting labor of honest interpretation, and it would be much easier to read because of its apparent simplicity and cheerfulness. The intent behind the use of statistics would seem to be the paramount concern, since it is intent which pre-determines whether more light will be thrown on a subject or simply tailor-made findings.

The foregoing is relevant to the sixth and last point at issue.

Exception is taken to my claim "that the consumer, by and large, became oversold by the middle of the year, and from that time on was too heavily obligated to continue purchasing, especially in the face of rising prices." Mr. Ayres says, "that is really the clincher in his (Mr. Fertig's) argument that instalment selling was the principal cause of our recent depression." Mr. Ayres is right, it is the clincher. Government statistics of retail sales and payrolls, adjusted for seasonal variation, which Mr. Ayres presents, bear out this assertion. Sales in the latter half of 1937 failed to make the normal seasonal increase and then fell off sharply. It is also true that payrolls fell even more sharply once the slide began. But payrolls declined because the channels of distribution had become clogged and production could not be maintained in the face of it. Let us look at the record.

The year 1936 was a tremendous one in retailing. Reflation, disbursement of the Soldier's Bonus, and a degree of national recovery, released an enormous demand for consumer goods, and production was stepped up on the assumption that consumers had ability to pay. By the middle of 1937 consumer debt had exceeded the danger point, although few people recognized it in time. The Federal Reserve Monthly Average of Retail Sales which was 84 1/3 for the first six months of 1936, rose to 90 1/6 in the second half, then jumped to 93 1/3 for the first six months of 1937, and 94 in the last half. This should have been warning enough when coupled with the Federal Reserve Board Index of Production, seasonally adjusted, which reached 121 in December, 1936. Such a high figure of production has never before lasted more than six months and in itself heralds a cyclical recession.

However, my article was not based wholly on Federal Reserve Index figures. Our own index, based upon retail sales in department and specialty stores scattered over half the country, has proven far more sensitive. This showed the percentage of the total year's business, allocated to the six months periods of 1936 and 1937 as follows:

First half 1936 . . 43.05 per cent
Second half 1936 . 56.95 per cent
First half 1937 . . . 49.07 per cent
Second half 1937 . 50.93 per cent

Unlike the Federal Reserve figures which recorded an increase in the first half of 1937 as compared with the previous six months, our figures showed a warning decline. In addition, our Index of Instalment Expansion reveals that at any time sales volume exceeds 140 per cent of invested capital, or instalment accounts receivable exceed 90 per cent of invested capital, the situation is dangerous. That danger point was reached by the middle of 1937.

It is hard to understand how one can disown the over-selling of consumers and attribute the sales decline to decreased payrolls. There is no problem as to which comes first like the chicken or the egg. Factories slowed down because they could not get rid of goods, retail sales fell off because consumers were glutted with contractual obligations. Of course, the reduction in payrolls made the situation much worse after the clogging began.

When Mr. Ayres writes "we have just come through one of the longest depressions on record, followed by a new slump before recovery was complete," we must not be led to overlook the difference between recovery in capital goods which was disappointing, and the recovery in consumer goods which approximated the peak of 1929. It was not an "enfeebled ability to make a normal recovery," but an artificial recovery stimulated by an excessive instalment selling. Perhaps the moral of this all is that we should take care that the real facts about instalment selling shall not be permitted to slide into obscurity on the grease of faulty statistics.

Of what Mr. Ayres calls my quasi-predictions of future events in the automotive industry, little need be said. If they are wrong, time will reveal the error. If, however, they have served to stimulate thought over a wider range of possibilities, and have given any suggestions to those whose responsibility it is to keep the automotive industry functioning in a healthy manner, their purpose will have been accomplished.

Self-Liquidating Dual Control on New Lincoln Welder

A line of "Shield-Arc" welders, said to provide greater convenience and accuracy because of a new self-indicating dual continuous control, has been announced by the Lincoln Electric Co., Cleveland, Ohio. These welders have both job selector and current control calibrated and equipped with dials which indicate the type of work and the number of amperes for each setting.

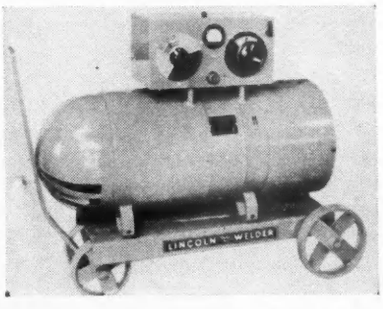
Another feature of the welder control is that both voltage control (job selector) and current control are continuous in operation. This design provides thousands of combinations of voltage and current.

Other features of the welders include: A self-protected motor on all AC motor-driven welders which is said to permit sustained operation with large size electrodes at high average welding current without danger of burnout.

Separate excitation of the welding generator in all types of these new welders provides the generator with a constant source of excitation which is independent of conditions at the welding arc.

A laminated magnetic circuit is employed in all types of welders providing minimum reluctance to the flow of magnetic flux.

Lincoln's new "Shield-Arc" Welder.



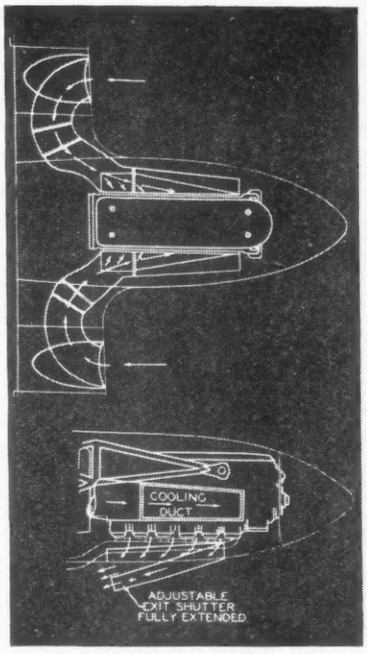
International Parade of Aero Engines

(Continued from page 817)

The Mawen radial, with revolving head performing the valve operations, and which is being developed concurrently in France and in the United States, is shown in three models, a 20 h.p., a 75 h.p., and a 150 h.p. These three types have undergone from 350 to 600 hour tests. A single-row engine of 350 to 400 h.p. (915 cu. in. piston displacement) is under construction, and the revolving head and distributor, in R.R. alloy, is on view. Designs have been completed for a four-row engine to be built in the United States.

Rolls Royce displays a new edition of the Merlin, a 12-cylinder with reducing gear, of 5.40 by 6 in., having a two-speed blower and using 100 octane fuel, the output being 1000 hp. at 3000 r.p.m. at ground level and 1265 h.p. at 10,000 ft.

By reason of the nationalization of their factory, the Farman brothers are specializing in the production and development of reducing gears and blowers, and have granted manufacturing licenses to a large number of foreign manufacturers. The latest blower has two turbines, one of which can be engaged or declutched at will, giving a two-stage blower. It is claimed that on the latest models the air temperature has been decreased by 25 per cent and that the air cooler can be dispensed with in most cases.



Paths of cooling air on De Havilland 12-cylinder Gipsy engine

In addition to the Sarazin damper adopted by Hispano-Suiza, the Redynam dynamic damper (Salomon patents) is displayed. The French firm shows two types, using steel pins and rings respectively and in addition to the simplex damper a duplex or two-stage damper.

Rubber mountings for both engines and instruments are very generally employed, the Ava appearing to be the one most commonly used. The Repusseau Co. shows the Renaux pneumatic engine mounting, consisting of a set of four small pneumatic tires (5¼ by 2 in.), the pair on the right-hand side being mounted on a vertical axis and the opposite pair on a horizontal axis. The air tube is of thick rubber (apparently 5/32 in.), while the outer casing is comparatively light. It is claimed that this pneumatic mounting completely eliminates the transmission of all vibration from the engine to the fuselage.

Among the very few new commercial planes is the Potez 662 all-metal, four-engined 12-passenger monoplane having a cruising speed of 250 m.p.h. and a range of 600 miles. The French contribution toward the North-Atlantic flight problem is the Potez 161 flying model, built to a scale of 1:2.6, equipped with six 40-h.p. Train engines. Preliminary experiments are being carried out with this flying model.

Anti-Knock and Mixture Distribution Problems

(Continued from page 822)

settings. The "outer" contour shows the spark advance actually obtained at each cylinder. The "inner" contour shows the spark advance required at each cylinder to give incipient detonation when the engine is receiving a 70-octane mixture of reference fuels. This required spark advance is, of course, dictated by the variation in mixture ratio received by the individual cylinders.

Inasmuch as these are polar charts, and the actual and required spark advances are plotted radially and in the order of cylinder firing, it follows that, by rotating one of the two charts about the common center, the maximum difference in octane-number requirement will occur when the superimposed contours are as shown in the chart at the left, which shows a variation between actual and required spark advance of 11½ deg. In the right-hand chart the two contours are shown in the position for the minimum difference between the actual and required spark advance, indicating 6½ deg. It appears from the above that, by simply selecting the best position for the distributor cam, as contrasted to the worst position, there is a possible reduction of 5 deg. in the spark advance causing knock. This is equivalent to reducing the octane-number requirement of the engine by 5 to 6 octane numbers—a very worthwhile reduction indeed, and one which could be realized in many cases during the assembly of the spark-advance mechanism at the factory.

Tools

(Continued from page 811)

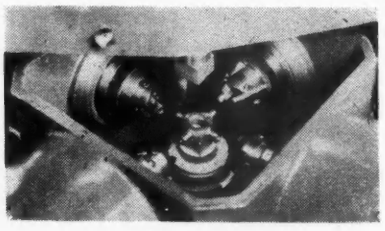
tions, are mounted on the heavy top brace. Each slide is independently controlled from its horizontal drum in the top brace, driven through gears and a vertical shaft from the lower cross slide drum shaft on the front side of the machine. This especially rigid top slide construction makes practicable the application of heavy tool holders in the two top spindle positions—as well as on the lower side slides—with the insurance of accuracy on wide and deep forming cuts.

Provision is made for the mounting of two centrally located side slides on the face of the headstock housing adjacent to the third and sixth spindle positions. These intermediate slides are each independently controlled by vertically mounted cam drums located on upright shafts and driven from the main drum shaft which also operates the lower side slide. These third and sixth position side slides permit many operations such as finish forming, form turning, recessing, and knurling. They provide for widely diversified side tooling operations in keeping with the increased number and styles of end working tools made possible by eight spindle design.

A modified and refined Geneva mechanism starts the spindle carrier indexing from a standstill, rapidly accelerates, then decelerates, bringing the movement to a dead stop without shock before the positive locking pin is engaged. The index arm roller engages hardened steel blocks on a gear which is continuously in mesh with the carrier ring gear. Both gears are heat-treated alloy steel.

A departure from the traditional practice of mounting the feed gears on the front side of the machine and the spindle speed gears on the end, is found in the new interchangeable feed change gear and spindle speed change gear system. All of these gears are mounted at the motor end of the machine and are quickly accessible simply by removing a cover without disturbing the motor mechanism or drive belt.

The open and widely arched spindle end of the machine provides for easy installation of the standard chip conveyor which is bolted to the rear end of the pan. Sheet metal guides on each side of the tooling area direct the chips to the bed of the conveyor where cross blades, fastened to an endless chain on each side, sweep the chips up an incline into any container.



Close-up view of spindles and work on four-way turning, chamfering, facing, centering and drilling machine for universal joint spiders recently built by the Reed-Prentice Corp., Worcester, Mass. This machine is equipped with rapid approach and rapid return to the spindles through hydraulic feed. Hydraulic mechanism is operated electrically.

The fixture also is hydraulically operated for rapid clamping of the work in position. At the end of the cycle of operation the clamp is released automatically, allowing the operator to remove the finished piece and replace it with a spider for the next operation.

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"See, I told you it was too short—he distinctly said your skirt had too much clearance!"

MOTOR AGE, September, 1938 17

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George Keller faces the problem of setting a trade-in allowance on an 1852 Studebaker!

BY BO BROWN
Automobile Trade Journal
September, 1938

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The Verdict

	Votes*	Points*
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Motor	1516	3703
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Automobile Digest	835	1712
Automotive News	733	1748
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*Individual standings: MOTOR AGE, 1061 votes, 2377 points. AUTOMOBILE TRADE JOURNAL, 1070 votes, 2387 points. "Votes" mean individual mentions; "points", 3 for 1st choice, 2 for 2nd, 1 for 3rd.

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PUBLICATIONS

Chestnut and 56th Streets, Philadelphia, Pa.

BUYERS' GUIDE

Automotive Products and Factory Equipment Manufactured by Advertisers in This Issue

See Alphabetical List of Advertisers on page 36

This Advertisers' Index is published as a convenience, and not as part of the advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to insert.

Air Valves, Punch Press
F. J. Littell Machine Co.

Alloys
Bethlehem Steel Co.
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Dow Chemical Co. (Magnesium)

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(*Turn to page 34, please*)

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BUYERS' GUIDE (*Continued from page* 33)

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